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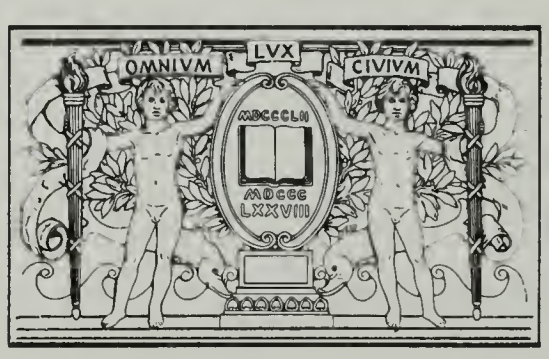

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Water Quality Management Plan/EIS For Cape Cod

Volume 1

Final Plan / Environmental Impact Statement

September 1978

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ENVIRONMENTAL IMPACT STATEMENT

and

208 WATER QUALITY MANAGEMENT PLAN

for

CAPE COD

VOLUME 1

Prepared by:

CAPE COD PLANNING AND ECONOMIC DEVELOPMENT COMMISSION

First District Court House

Barnstable, Massachusetts 02630

September 1978

U.S. ENVIRONMENTAL PROTECTION AGENCY

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Plan Summary

EXECUTIVE SUMMARY
FINAL ENVIRONMENTAL IMPACT STATEMENT

U.S. Environmental Protection Agency
Region I
Boston, Massachusetts

1. NAME OF ACTION

Administrative (x)
Legislative ( )

2. INTRODUCTION

Groundwater is the only source of drinking water on Cape Cod. Surface waters, both fresh water ponds and coastal waters, are the Cape's major economic resource attracting thousands of visitors and seasonal residents each year.

The Cape has generally excellent water quality. However, increasing residential densities and the three-fold summer population influx have caused some isolated water quality and wastewater management problems. Anticipated future growth threatens to cause more serious water quality problems, primarily potential groundwater contamination and increasing pond eutrophication.

The Cape Cod Planning and Economic Development Commission has conducted an areawide wastewater management planning program under Section 208 of PL 92-500 and published its Draft Water Quality Management Plan for Cape Cod in May, 1978. This draft plan examines the major water quality and wastewater management problems confronting Cape Cod and offers a series of alternatives in the areas of land use controls, wastewater management, non-point source controls, and institutional arrangements for improved water quality management.

EPA and CCPEDC sponsored a formal 45-day public review period in accordance with NEPA which ended on July 20, 1978. The public comments received during this review period provided the basis for selecting the recommendations presented in this final Water Quality Management Plan/ EIS for Cape Cod. Public comments on the draft plan and staff responses to these comments are also presented in Volume 2 of this final plan.

3. DESCRIPTION OF PROPOSED ACTIONS

The final plan recommendations deal with the Cape's major water quality problems on a regional basis but recommendations have also been made to each Cape town to address those water quality problems considered to be a priority. The major recommendations of the final plan are as follows:

Wastewater Management

Approximately 90% of the Cape's year-round population relies on on-site wastewater disposal systems. While the 208 program has determined that central sewage treatment facilities are needed in certain isolated areas, the majority of the Cape's population will continue to rely on on-site disposal for the 20-year planning period.

The final plan recommends that towns with 208 designated sewer service areas should proceed with 201 facilities planning and construction (Barnstable, Bourne, Chatham, Falmouth, Provincetown and Sandwich). Those towns that have serious wastewater management problem areas which do not require central collection sewers should seek funds for a 201 facility plan to evaluate decentralized solutions including on-site system rehabilitation, treatment systems and septage treatment facilities (Barnstable, Dennis, Harwich, Orleans and Wellfleet).

It is further recommended that all towns participate in regionalizing septage treatment and disposal facilities to deal with non-sewered areas. Finally, it is recommended that all towns carry out an on-site system management program including regular maintenence, strict enforcement of Title 5 of the Massachusetts Environmental Code, upgrading of failing systems and proper installation practices supervised by qualified health agents.

Land Use Controls

Cape Cod is a highly seasonal area with a year-round population in 1975 of 128,000 and a summer population of 382,000. At the present time, most of the population resides in shoreline areas. It is expected that much of the projected growth, however, will settle in more inland areas where most public water supply wells are located and along the shores of the Cape's many inland ponds.

To protect both ground, surface and coastal waters, the final plan recommends that towns establish protective overlay districts for major "Water Resource Protection Areas" that would prohibit major polluting uses and limit residential density. The most stringent density requirements are recommended for the areas that contribute recharge to public wells.

Water Supply Management

The Cape has one aquifer which is divided by natural boundaries into five major groundwater basins. If water quality degradation takes place in one town, it must rely on neighboring towns for an adequate water supply. The emphasis of the 208 plan is on the prevention of water supply degradation through land use controls. It is further recommended that the towns cooperate in regional water supply planning to encourage water supply self-sufficiency and to effect adequate protection measures.

Non-Point Source Controls

Non-point sources of pollution are considered to be the major water quality problem on Cape Cod and the final plan makes the following recommendations to control these sources:

1. Present landfill practices should be upgraded and disposal facilities regionalized.

2. On-site systems should be controlled through density restrictions and the recommended management program.

3. Road salt use should be reduced in areas impacting public and private water supplies and all road salt should be stored in enclosed sheds.

4. All underground oil and gasoline storage tanks should be fiberglass or coated with fiberglass. All commercial distributors should maintain daily inventory records to detect leaks.

5. Surface infiltration of stormwater runoff should be encouraged by local regulations. Best management practices for urban storm drains and for agricultural activities should be adopted and enforced by the state.

6. Towns should utilize the computer model of the Cape's aquifer system, prepared by USGS, for water supply development and to avoid salt water intrusion.

Areawide Management Structure

The institutional arrangements and legal authorities for improved wastewater management presently exist. The recommendation of the final plan that responsibility for water resource planning and coordination and for a regional water quality monitoring program be designated to the CCPEDC. Towns should retain their authority over structural facilities planning, construction and operation, land use controls and non-point source controls. The CCPEDC, however, should examine the potential for increasing the regional role in these areas beyond construction and technical assistance.

4. PURPOSE OF PROPOSED ACTIONS

The final plan provides a comprehensive and integrated approach to improve the management of water quality and wastewater disposal problems on Cape Cod. The implementation of the plan recommendations should insure the protection of the Cape's drinking water quality and maintain fishable and swimmable waters meeting the 1983 goals PL 92-500.

5. SUMMARY OF IMPACTS

Since the recommendations of the final plan are regional in nature, most of the anticipated impacts are not site specific and must be considered on a regional basis. The following major beneficial and adverse impacts are anticipated from the proposed actions.

Wastewater Management

Construction of sewer systems in recommended sewer service areas will cause short-term environmental damage and disrupt traffic patterns. Minor changes in groundwater levels in the sewered area can be expected. Sewering will also have the economic impact of raising taxes and requiring substantial user fees. All of the wastewater management recommendations will improve water quality and public health. The decentralized approach of avoiding future sewer needs is compatible with the areas economic, social and political structure.

Land Use Controls

There are no adverse environmental impacts from the land use recommendations. It is expected that minimal short-term economic impacts may take place in certain areas where lowered densities decrease the value of some

individuals' property. However, there is a long-term economic gain in avoiding future water supply treatment and in-lake management programs. The land use controls recommended will also help to preserve the community character of the region.

Water Supply Management

There are no adverse environmental, social or economic impacts associated with these recommendations.

Non-Point Source Controls

There are no adverse environmental impacts expected from these recommendations. It is anticipated that improved landfill practices and regionalizing disposal facilities will have economic impacts, as such improvements will require additional tax support. Increased recycling would also require certain social changes. Minimal economic impacts are also anticipated from the recommendation to require fiberglass gas and oil storage tanks due to the somewhat higher cost of these tanks. The recommendation to store road salts in enclosed sheds could result in a slight tax increase for the construction costs.

Areawide Management Structure

There are no environmental impacts associated with this recommendation but there would be a small increase in the county budget to support CCPEDC's continuing water quality planning efforts.

6. MITIGATING ACTIONS

The final plan recommendations include the following considerations directed at mitigating adverse impacts:

1. Sewer service areas are limited and alternatives to sewers are emphasized.

2. Land use controls are aimed only at those priority areas critical to water resources.

Introduction

1

In May, 1978 the Cape Cod Planning and Economic Development Commission published a Draft Water Quality Management Plan/EIS for Cape Cod. The draft plan was prepared with funds provided by the EPA under Section 208 of the Water Pollution Control Act Amendments of 1972 (PL 92-500). The draft plan is the product of over two years of planning by consultants and staff, along with interested citizens and public officials who participated in the planning program.

Section 208 of PL 92-500 calls for areawide wastewater management planning to achieve the national goal of restoring and maintaining "the chemical, physical and biological integrity of the Nation's waters". The purpose of the 208 planning program is to identify the water quality management problems of a region and to develop cost effective and environmentally sound approaches to deal with those problems on an area-wide basis.

Over 200 regions in the country received 208 planning grants, most with 100 percent federal funding. This unusual federal support for the 208 planning program emphasizes the importance that Congress has given to the concept of areawide wastewater management planning. Traditionally, towns with serious wastewater management problems have sought federal funding assistance to construct treatment facilities. Little attention was given to regional approaches or to alternatives to centralized sewerage facilities. Even more important, there has been no regional water quality management plan that addressed methods of preventing the development of wastewater management problems. It has been traditionally assumed that all areas, as they urbanize, would eventually need a sewerage system.

The 208 program here on Cape Cod and throughout the country has helped to change these traditional views. Actions can be taken now, that will prevent the development of serious wastewater management problems and that will protect water quality for recreational and drinking water purposes. The recommendations developed in the 208 plan are designed to provide a comprehensive preventive approach to wastewater and water quality management as well as guidelines for solving existing problems.

The 208 draft plan identifies the present and potential water quality problems of Cape Cod, offers alternative methods of dealing with these problems and preliminary recommendations for a comprehensive water quality management program. The draft plan provides a detailed assessment and analysis of the major water quality management issues examined during the 208 planning program. This analysis is based on consultant reports and staff examination of current literature which is available in the CCPEDC office. This detailed background information has not been repeated in the final plan.

It is hoped that those individuals who review this final plan will view it as a companion document to the draft plan. In general, the draft plan provides the baseline information for the final plan recommendations except in those sections where new information has been added to provide background for newly developed recommendations.

Since the draft plan was published in May, the EPA and CCPEDC have sponsored a formal 45-day public review period which is discussed in detail in the "Public Participation" section. The comments that were received during this review period were used to refine the preliminary recommendations presented in the draft plan. Additional recommendations were also developed on the basis of public comments. Thus, the final plan is aimed primarily at presenting the recommendations of the 208 plan. The environmental impacts of the chosen alternatives are also presented for consideration.

There are two volumes to the final plan. Volume 1 presents the final plan recommendations and environmental impact analysis. Volume 2 provides all of the public comments submitted during the formal public review period and the 208 staff responses to those comments.

Volume 1 is presented in a direct and concise format to facilitate reading and to serve as a handbook for water quality management on Cape Cod. Chapter 2, "Water Quality Management Recommendations" is organized into sections dealing with the major areas of concern studied during the planning period: "Water Quality Assessment," "Wastewater Management," "Land Use Controls," "Water Supply Management," "Non-Point Source Controls," "Water Conservation" and "Management Agencies." An overview discussion is presented for each of these areas along with federal, state regional and local recommendations. Environmental impacts of the recommendations are also presented in this chapter.

Specific priorities for local action are discussed by town, in Chapter 3, "Town Recommendations." The recommendations presented in this chapter suggest those water quality management problems in each town that need special attention. Chapter 4, "Public Participation" explains the Draft Plan Review Process and outlines the activities that took place during the formal public review period.

Public Review of Final Plan

Following publication of this final plan, there will be a final 30-day public review period. Each of the 15 town boards of selectmen will be asked to review the final plan and comment to the Department of Environmental Quality Engineering on the plan's recommendations. These town comments will be used by the state in reviewing the final plan and in determining which sections of the plan the Governor will approve and certify. Those sections of the final plan that are certified by the Governor and approved by EPA will be eligible for continued 208 funding. Through such approval EPA and the state will also be indicating their intention to comply with the recommendations within the limitations of their authority.

It must be emphasized that the 208 plan, however, is not a static document but will be updated on an annual basis to meet new needs and demands. It is believed that the 208 planning program and the draft plan recommendations have helped to raise the awareness of citizens and public officials to the need for continuing, comprehensive regional water

quality planning and management. Some of the recommendations developed by the 208 program have already been adopted by towns and many town officials have indicated their willingness to be involved in the implementation of the recommendations.

Some of the recommendations presented in the final plan call for substantial changes in the traditional management arrangements. It is not expected that these changes will take place immediately. It is hoped, however, that the 208 final plan will serve as an impetus for local, regional, state and federal action that will improve present regulations, procedures and programs relating to water quality management. Such changes are needed to meet the goals of the Clean Water Act and to maintain the quality of the Cape's water resources for its present and future populations.

Water Quality Management Recommendations

2

Water Quality Assessment

Wastewater Management

Land Use Controls

Water Supply Management

Non-Point Source Controls

Water Conservation

Management Agencies

Water Quality Assessment

During the 208 planning program all available water quality data for Cape Cod were collected and computerized. Testing programs were carried out to augment groundwater and surface water data, and special studies of storm runoff and sanitary landfills were conducted. The results of these testing programs are summarized in the draft plan. Original data may be reviewed at the CCPEDC office in two interim reports: Final Report: Groundwater Quality, and Final Report: Surface Water Quality (Environmental Management Institute, 1976).

Since publication of the draft plan, new coastal water quality data have become available from DWPC, and revised water quality standards have been adopted. The purpose of the following discussion is to update the 208 plan in light of this new information and to present revised recommendations for a regional monitoring program. A discussion of existing point source discharges and NPDES permits which was inadvertently omitted from the draft plan is also presented.

The discussion is presented in five sections:

--Segment Classification and Standards
--Water Quality Trends
--Present Quality
--Point Source Discharges
--Monitoring Recommendations

Segment Classification and Standards

Surface and Coastal Waters

The Commonwealth of Massachusetts adopted revised segment classifications and water quality criteria on September 21, 1978. No changes were made in the classification of Cape Cod waters. The coastal waters remain designated "SA" (Suitable for swimming and shellfishing without depuration), with the exception of the Cape Cod Canal and Falmouth Inner Harbor, which are "SB" (shellfishing restricted). The inland waters are classified "B" (swimmable/fishable) except for Long Pond in Falmouth, which is classified "A" (for water supply). Figure 2.1 indicates segment classifications and existing conditions.

Several new anti-degradation regulations were applied to the Cape's waters as shown below:

Waters	Regulation
Surface waters subject to the rise and fall of the tide	4.2 "High Quality Waters." Waters whose quality is or becomes higher than that necessary to sustain national goal uses shall be maintained at that higher quality unless limited degradation is authorized by the Division of Water Pollution Control.
All other surface waters (not subject to the rise and fall of the tide)	4.3 "Low Flow Waters." New or increased discharges prohibited unless a variance is granted by the Division.
Coastal waters of the Atlantic Ocean adjacent to the Cape Cod National Seashore	4.4 "National Resource Waters." New discharges are prohibited and existing discharges shall be eliminated unless the discharger is able to demonstrate that: a) alternative means of disposal are not reasonably available or feasible; and b) the discharges will not affect the quality of the water as a national resource.

The minimum criteria for these classifications are on file at the CCPEDC office, and are available from the Division of Water Pollution Control. No changes in classification of surface or coastal waters are recommended at this time.

Additional regulations are imposed on all of the coastal waters of the Cape by the Ocean Sanctuaries Act. The Act was revised and new regulations were issued in 1978 which prohibit all new municipal discharges and the expansion of existing discharges.

Groundwater Standards

There is no system of classification of groundwaters in Massachusetts, and consequently no minimum criteria for groundwater quality have been established. In the 208 assessment groundwater samples were compared against drinking water standards and background (modal) water quality (see draft Chapter 3). The need for groundwater standards falls into two areas: water quality assessment and effluent limitations. The following guidelines are recommended:

1. Throughout the Cape groundwater samples should be compared to background water quality and drinking water standards for the purpose of monitoring and assessing the impacts of non-point sources of pollution.

2. In areas presently believed to be within, or upgradient of, recharge areas for existing water supply wells, or in potential water supply development areas (see draft plan Map 5.6) drinking water standards for chemical constituents should be applied except that the standard and planning goal for nitrate nitrogen concentration should be 5.0 ppm.

3. Effluent limitations on sewage treatment plants in areas referred to in item 2 above above should meet the standards recommended in 2, measured at the water table.

With the exception of the nitrate nitrogen limitation, these recommendations are intended to be consistent with EPA effluent quality criteria for discharges to the ground from federally-funded sewer treatment plants. EPA defines three cases of groundwater use and effluent limitations, as follows:

--Case I. The groundwater can potentially be used for drinking water supply. The groundwater resulting from land application of the wastewater shall meet the maximum contaminant levels for organic and inorganic chemicals specified by the National Interim Primary Drinking Water Regulations. Or, if the existing concentration of any parameter exceeds the maximum contaminant levels, there should be no increase in concentration of that parameter.

--Case II. The groundwater is used for drinking water supply. The criteria for Case I should be met, and the maximum microbiological contaminant levels for drinking water supply systems must be met where groundwater is used without disinfection.

--Case III. Uses other than water supply. Site-by-site criteria to be established by the Regional Administrator based on present or potential use of the groundwater.

In all cases a monitoring system is required. Recommendations on the application of these criteria on Cape Cod are made in the "Sewer Construction Projects" section of this plan.

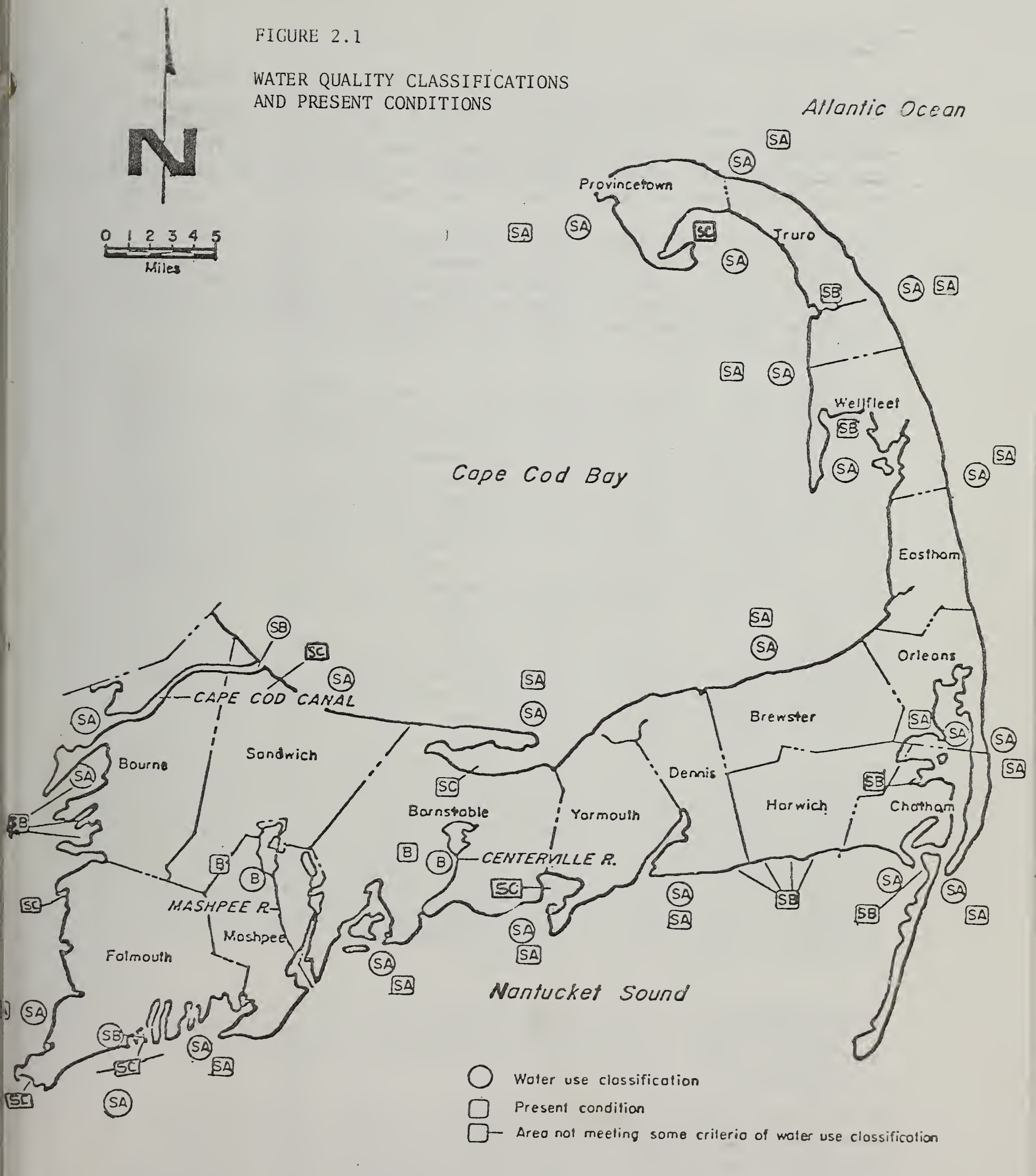
Water Quality Trends

The draft plan identified and discribed short-and-long-term water quality trends of concern on Cape Cod, with respect to both surface and groundwaters. These trends are summarized below:

Water Resource	Critical Pollutant	Source	Trend
Short term:			
Surface and Coastal waters	Coliform	Overflows and illegal direct discharges from failing on-site systems	Contamination of shellfish beds; swimming quality threatened
Long term:			
Groundwater	Nitrate	High density use of on-lot systems; sewage treatment plants and fertilizer	Concentrations threatening drinking water quality
Fresh surface waters	Phosphorus	Fertilizer runoff and on-site systems	Eutrophication
Coastal embayments	Nitrate	On-site sewage systems in high densities	Eutrophication

FIGURE 2.1

WATER QUALITY CLASSIFICATIONS
AND PRESENT CONDITIONS



SOURCE: Division of Water Pollution Control, 1976

Present Quality

A water quality assessment was performed as part of the 208 program, the results of which were reported in detail in the draft plan. Groundwater quality was found to be generally above drinking water standards. Surface waters and coastal waters generally meet the 1983 goals of swimmable and fishable quality. Some evidence of degradation in both ground and surface waters was found, however, as summarized below.

Private wells: 150 private wells were tested by the 208 program. Nitrates in excess of public health standards were limited to isolated locations, although many wells showed nitrates above natural background levels. Private well samples are probably indicative of localized water quality problems, such as the contaminated "plume" from a single on-site system.

Water Supplies: Regional water quality is more accurately reflected by water quality in public supply wells. No broad-scale water quality degradation appeared to exist associated with nitrate levels in public wells. Many public wells exhibit background levels. A few supplies in highly developed areas, however, show increasing nitrate levels, though well below drinking water standards. In addition to nitrate, sodium was found to be an increasing problem in several public supply wells located near Route 6. This is attributed to road salting. Close attention should be paid to such trends in public water supplies, since it is likely that several decades may elapse before the full water quality impact of development is felt.

Surface Waters: Many ponds show evidence of increased algae growth. Frequently groups of nearby lakes were found to have algae problems, possibly reflecting general groundwater overloading from non-point sources associated with urban development. A few ponds showed winter increases in salinity, presumably due to the drainage of road salts applied for snow and ice removal. Intensive studies of several ponds in Falmouth were conducted by the Association for the Preservation of Vineyard Sound, the Falmouth Board of Health and the Barnstable County Health Department during the summers of 1977 and 1978. The results showed serious contamination in the total and fecal coliform concentrations well in excess of public health standards for recreational use. This is attributed by those groups and Falmouth's engineering consultant, Camp, Dresser and McKee to septic system failures and direct discharges. This is the first serious case of pollution documented in inland lakes and ponds.

Coastal Waters: The DWPC surveyed water quality in all coastal segments in the summer of 1976. The data, received after publication of the draft plan, showed several segments not meeting criteria for their classifications.

Since many instances were associated both with high density on-shore development and marinas, further investigation is necessary to determine the sources of the problems. It is apparent that both marine head discharges and urban runoff, possibly contaminated with septic system overflows, are contributing factors. Table 2.1 lists segments not meeting their classifications. Figure 2.1 shows the locations of violations.

TABLE 2.1

CAPE COD SEGMENTS NOT MEETING CLASSIFICATION

BOUNDARY	PRESENT USE	ANTICIPATED FUTURE USE	PRESENT CONDITION	CLASSIFICATION
Cape Cod Canal, Bourne and Sandwich	Recreational boating, fish & wildlife propagation, fishing, industrial processing & cooling		SB	SB
Mill Creek, Sandwich	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing fish & wildlife propagation, fishing, shellfishing	SC*	SA
Barnstable Harbor, Barnstable	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SA
Wellfleet Harbor, Wellfleet	Restricted shellfishing, recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Pamet River, Truro	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Provincetown Harbor, Provincetown	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SA
Frostfish Creek, Chatham	Recreational boating, fish & wildlife propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Stage Harbor, Chatham	Recreational boating, fish & wildlife propagation, fishing, bathing restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA

TABLE 2.1 (cont.)

BOUNDARY	PRESENT USE	ANTICIPATED FUTURE USE	PRESENT CONDITION	CLASSIFICATION
Wychmere Harbor, Harwich	Recreational boating, fish & wildlife propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Allens Harbor, Harwich	Recreational boating, fish & wildlife propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SB
Herring River, Harwich	Recreational boating, fish & wildlife propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Swan Pond River, Dennis	Recreational boating, fish & wildlife propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Lewis Bay, Barnstable	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SA
Falmouth Inner Harbor, Falmouth	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SB
Great Harbor, Falmouth	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SA
Eel Pond (Woods Hole), Falmouth	Recreational boating, fish & wildlife propagation, fishing, bathing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SC*	SA

TABLE 2.1 (cont.)

BOUNDARY	PRESENT USE	ANTICIPATED FUTURE USE	PRESENT CONDITION	CLASSI-FICATION
Wild Harbor, Falmouth	Recreational boating, fish & wild-life propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing fish & wildlife propagation, fishing, shellfishing	SB*	SA
Red Brook Harbor, Bourne	Recreational boating, fish & wild-life propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Pocasset Harbor, Bourne	Recreational boating, fish & wild-life propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
Phinneys Harbor, Bourne	Recreational boating, fish & wild-life propagation, fishing, bathing, restricted shellfishing	Recreational boating, bathing, fish & wildlife propagation, fishing, shellfishing	SB*	SA
All waters in Cape Cod Basin subject to the rise and fall of the tide unless denoted above	---	---	SA	SA
All fresh water streams in Cape Cod Basin	---	---		B

*Portion of the designated area not meeting classification.

Cape Cod's coastal waters are periodically degraded by oil spills. In fact, large areas had been closed to shellfishing in the Buzzards Bay area because of hydrocarbon contamination at the time of publication of the draft plan. These areas have since been re-opened, but it is expected that oil problems could increase in the coming years unless new federal regulations on oil tanker safety are effectively enforced.

Point Source Discharges

While most of the water quality problems identified and anticipated on Cape Cod are related to non-point sources, there are several point sources under NPDES (National Pollutant Discharge Elimination System) permits.

The discharges are summarized in Table 2.2 "Discharges to Surface Waters: Cape Cod Basin." Because of the recent revisions to the Ocean Sanctuaries Act strengthening prohibitions against point source discharges, it is not expected that any new municipal discharges will be allowed. Existing discharges should be eliminated wherever possible by hookup to the proposed Buzzards Bay/Wareham regional collection system. This appears particularly feasible in the case of the Massachusetts Maritime Academy.

It is recommended in the "Water Quality Management" section of this report dealing with non-point sources that a general permit program be considered to control agricultural and stormwater runoff. This would provide an enforcement mechanism of particular value in the inland waters designated "Low Flow Waters."

Monitoring Recommendations

The Cape Cod Water Quality Plan is primarily concerned with preventing water degradation from non-point sources largely through non-structural control measures. Evaluation of the effectiveness of such a program is dependent upon a continuing comprehensive monitoring program.

The comprehensive program should be designed to serve two functions: public health surveillance and analysis of long-term environmental/ water quality trends. Monitoring projects that should be conducted under each of these functions are as follows:

Public Health Surveillance - to assure that water supplies, recreational waters and shellfishing areas presently meet established standards for the protection of public health.

a. Private water supplies - a full time chemist in the County Health laboratory should test private well samples for bacterial and chemical constituents specified by the Safe Drinking Water Act (SDWA) within the limitations of lab facilities, (exclusive of heavy metals and organic compounds). The number and location of sample points to be specified in a work program developed in cooperation with County Health, CCPEDC, town boards of health and DEQE. Assistance in sample collection provided in first year by CCPEDC.

TABLE 2.2

DISCHARGES TO SURFACE WATERS - CAPE COD BASIN (1977)

MUNICIPALITY	FACILITY	FLOW GPD	RECEIVING WATER	TYPE OF DISCHARGE	COMMENTS
Barnstable	Barnstable County STP	15,000	Barnstable Harbor	Municipal Wastewater (Secondary Treatment)	Effluent limitiations set for BOD_5, TSS, Cl_2, SS, pH, Total and Fecal Coliform-seasonal discharge.
Bourne	Canal View Apartments	12,000	Cape Cod Canal	Sanitary Wastewater	Completed new system and ceased discharge. Permit to be canceled.
	Mass. Maritime Academy		Cape Cod Canal	1. Thermal 2. Sanitary waste* 3. Swimming Pool *Secondary Waste	Flows for each discharge: 1. 6,000 gpd; 2. 14,000 gpd; 3. 9,000 gpd. Effluent limits set for BOD_5, TSS, Cl_2 and fecal coliform.
	Coca Cola Bottling Co.	25,000	Cape Cod Canal	Thermal	EPA has determined this to be bottle washing and cleaning water only. Effluent limits are set for BOD_5 and temp. Effluent to be resampled by DWPC to verify non-contamination.
Falmouth	Woods Hole Sewerage System	250,000	Great Harbor	Municipal Wastewater	Chlorinated wastewater. Town under orders to improve and/or alleviate discharge.
	U.S. Dept. Commerce NMFS N.E. Fisheries Center	13,000	Great Harbor	Aquarium System	Flows vary between winter minimum and summer maximum. Effluent limits set for flow, temperature and total coliform.

TABLE 2.2 (cont.)

MUNICIPALITY	FACILITY	FLOW GPD	RECEIVING WATER	TYPE OF DICHARGE	COMMENTS
Falmouth	U.S. Coast Guard Lt. Station at Cleveland Ledge	400	Buzzards Bay	Sanitary Wastewater	Discharge from showers, sinks and dishwashers only. Electric toilets have no discharge.
	WHOI Research Facility	1,500,000	Nantucket Sound	Aquacultural	Effluent limits set for settleable solids, ammonia, nitrogen, total coliform and phosphorous.
	Water and Sewer Division	5,400	Grews Pond	Thermal	Flow and temperature.
Sandwich	Henry T. Wing School	14,500	Cape Cod Bay	Sanitary Wastewater	Effluent limits set for BOD_5, TSS, SS, Fecal and Total Coliform.
	Canal Marine	144,000	Cape Cod Canal	Thermal	Effluent limits set on flow and temp. (90°F. max.)
	Canal Electric Units 1 & 2	522,250,000	Cape Cod Canal	Thermal	Effluent limits set on flow and temp. (90°F. max.) Biological studies also in progress.
	U.S. Coast Guard	2,000	Cape Cod Bay	Sanitary Wastewater (Secondary Treatment)	Effluent limits set on BOD_5, TSS, SS, Fecal Coliform.
	Sandwich Fish Hatchery	5,000,000	Dock & Scorton Creeks	Aquacultural (Two discharges)	Effluent limits set on Settleable Solids, ammonia nitrogen, SS.
Dennis	Aquacultural		Chase Garden Creek	Aquacultural (Two discharges)	Effluent limits set on BOD_5, TSS, SS, Total Coliform.
Yarmouth	Willow Wood Development Trust, Buck Island Road (210 Unit Development)	50,000	In-ground Discharge	Sanitary Wastewater (Secondary Treatment)	Effluent limits set on BOD_5, TSS, SS, Total Coliform, P, Ammonia as Nitrogen.

b. Bathing Beaches (fresh and saltwater) - periodic testing by County Health Department of bacterial concentrations at request of local boards of health.*

c. Shellfish Areas - regularly monitored by DEQE, with some samples to be tested by County Health Department where necessary to supplement DEQE program, at request of town.*

d. Public water supplies - chemical analyses required by SDWA performed annually by DEQE. Bacteriological analyses performed by County Health Department.*

Analysis of Long-term Environmental and Water Quality Trends - to detect and analyze trends in ground and surface water quality in order to identify problem areas and improve planning and management techniques.

a. Groundwater Quality - All water supply data obtained by County Health, DEQE and private studies to be collected and computerized for analysis by CCPEDC. Technical assistance and computer resources to be provided by USGS.

b. Coastal Water Quality - Bacteriological and chemical analysis of coastal segments and comparison with standards set for classification will be performed at 5-year intervals by DWPC. Effluents under discharge permits tested bi-annually.

County Health and DEQE shellfish data and DWPC segment data to be compiled by CCPEDC to assist public and private agencies in identifying wastewater management problem areas and facilities needs.

c. Pond Quality - A program for periodic evaluation of ecological conditions of the great ponds is to be developed. A minimal effort would include the following testing procedures:

--temperature/dissolved oxygen profiling
--secchi disc readings
--chlorophyll-a analyses

These tests to be during peak use periods

--phosphorus analyses
--nitrogen analyses (ammonia, nitrate, and organic)

Tests should be performed, at a mimimum of once every five years. Annual or semi-annual performance of these would be preferable.

Funding possibilities for such a testing program would include direct County participation or town-County cooperation. Work could be performed by a subcontractor or County personnel. More information on the costs of such a program should be developed in the on-going 208 planning program during Fiscal Year 1979.

* Continuation of present effort

The Mass. DWPC Lake Classification Program, scheduled to begin analysis of Cape Cod ponds in 1980, should be given priority for funding by the Secretary of Environmental Affairs so that complete baseline data will be available on all surveyed ponds by 1985.

Detailed analyses necessary to diagnose water quality problems and develop abatement programs under the state or EPA lake restoration program should be performed on an individual basis, funded either by towns or private concerns.

d. Special Source Studies - The location of leachate plumes beneath inland sewer treatment plant disposal sites and sanitary landfills is a costly and highly specialized science. Knowledge of groundwater hydrology is necessary to design a successful monitoring well network. It is necessary to penetrate the full thickness of the aquifer to establish the vertical dimensions of the plumes, necessitating costly deep drilling programs in some cases. To date the only complete plume location program is the study of the Otis sewer treatment facility being conducted by the USGS.

   Plume studies utilizing the methodology being developed and demonstrated by USGS are necessary in cases when sources are upgradient of water supply wells. A county water quality surveillance program involving contracts with towns and USGS may be the most cost effective and reliable approach to landfill and sewer treatment plant monitoring. The feasibility of such a program will be investigated in the continuing 208 planning program. Until a specific project has been developed it is recommended that Barnstable County Health Department activities in this area be limited to monitoring private wells downgradient of, and nearby, landfills.

e. Water Table--Zone of Transition Monitoring - The water table observation well network established by the USGS in the Cape Cod Water Study should be used for continuing water table monitoring under the direction of CCPEDC. Computerized data storage and analysis will be provided by USGS.

   Zone of transition wells, monitoring the location of the fresh/saltwater interface will continue to be maintained and tested by USGS bi-annually.

f. Toxic organic assessment (See draft Chapter 3, p. 3-43) - Groundwater samples from observation wells under the following areas should be screened for toxic organic compounds:

   --parking lot catch basin
   --golf course or power line where pesticides/herbicides are used
   --landfill-when plume has been located by specific conductance
   --septic leach facility in which chemical scouring agents containing chlorinated hydrocarbons has been used

   These analyses should be performed by DEQE or USGS as a special study.

Recommendations on financial and institutional arrangements necessary to implement this comprehensive monitoring program are found under the "Management Agencies" discussion.

Wastewater Management

The primary wastewater management problem on Cape Cod is failure of on-site disposal systems. This plan is concerned with two aspects of on-site system "failure." The first is mechanical failure, in which raw sewage breaks out onto the land surface or overflows into water bodies. The second is water quality degradation caused by the underground flow of leachate from on-site systems.

The sewer service area recommendations presented in the following sections are based primarily on the abatement of mechanical failures where rehabilitation of on-site systems appears to be infeasible. No data are available, however, to enable the isolation of water quality problems due to properly operating septic systems from mechanically failing systems. For this reason, no sewers have been recommended on the basis of water quality problems alone.

The water quality impacts of properly operating systems will need to be carefully watched through continuing surface and groundwater monitoring programs. Should a critical water quality problem be detected in the future, sewer construction should be considered. It is questionable, however, that sewers would be totally effective in abating such water quality problems because of the numerous additional non-point sources associated with high density development. Towns are advised to prevent nitrate buildup in water supply wells by controlling housing densities (see "Protecting Critical Water Resources").

Wastewater management recommendations are presented in four subsections:

--Sewer Construction Projects
--Neighborhood Solutions and Septage Treatment
--On-Site System Management
--Environmental Impact

Sewer Construction Projects

General Recommendations

The draft water quality plan identifies three categories of problem areas in the Cape Cod study area. It recommends the selection of one of three wastewater management alternatives for each town, ranging from preventive action to limited sewering.

Upon certification of the final 208 plan, the scope and purpose of 201 facilities plans will be to obtain further information necessary to implement the 208 plan's recommendations. Future 201 studies should refine sewer service areas through a more detailed needs survey and analyze treatment and disposal alternatives. Future facility plans must be consistent with the 208 recommendations in order to receive federal and state construction grants.

The following recommendations on facilities needs should be used as the basis for future facilities plans: (See Wastewater Management Problem Areas Map and Sewer Service Areas Map, reprinted from draft plan)

--Centralized collection and treatment systems are recommended for Category 1 problem areas. Future phases have been included to encompass adjacent Category 2 areas. This should not preclude consideration of non-sewered alternatives for adjacent Category 2 areas. (See Sewer Service Area Map 2.2.) The towns and regions for which new or extended sewer systems are proposed are: Buzzards Bay/Wareham, So. Sagamore/Sandwich, Falmouth, Yarmouth, Chatham, Barnstable, Provincetown/North Truro.

--Improved on-site systems or small collection and treatment systems using package treatment plants should be constructed in Category 2 problem areas. The full range of decentralized alternatives should be examined for these areas (see "Neighborhood Solutions and Septage Treatment" section).

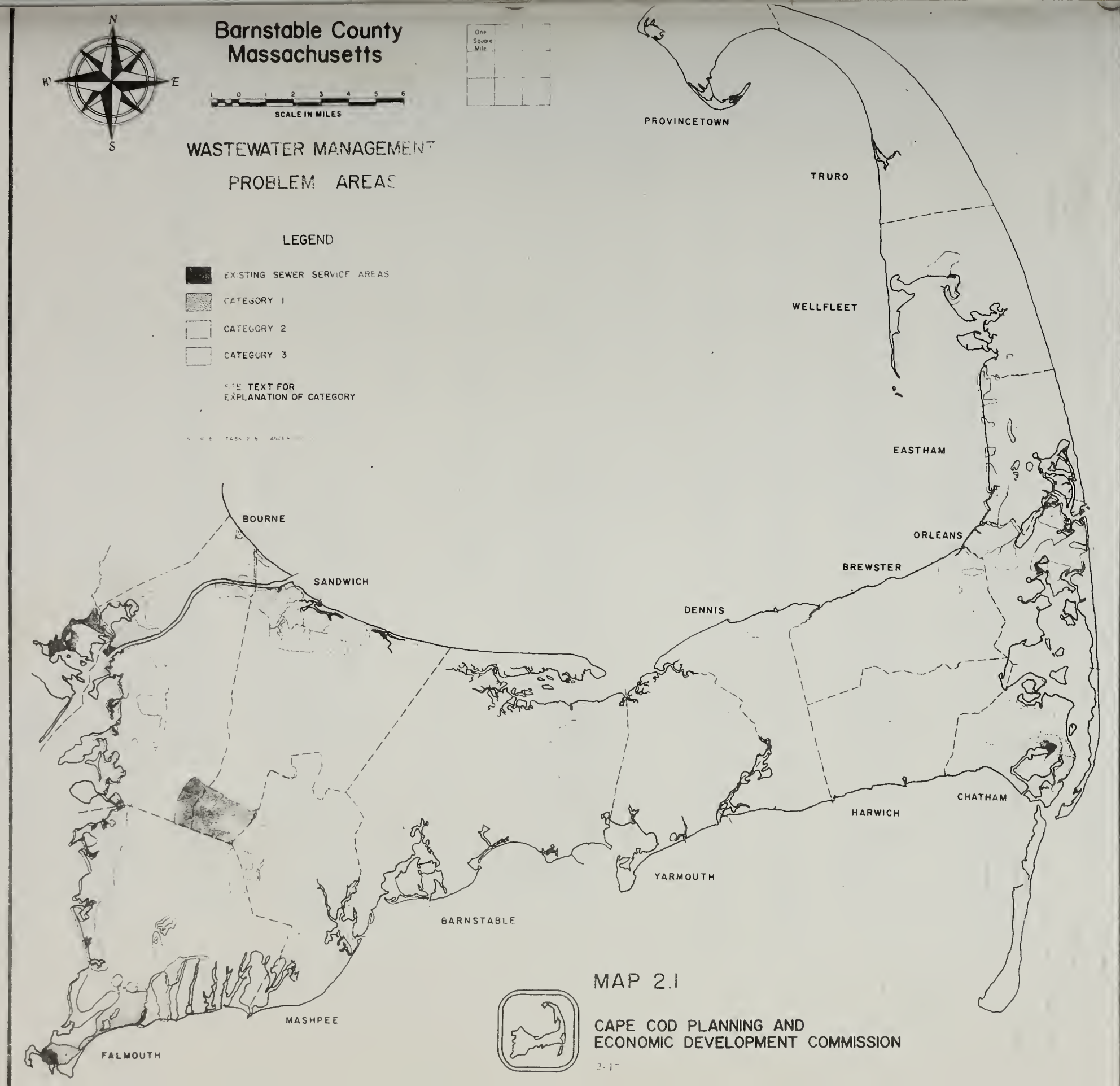
--Additional water quality analysis is necessary in Category 3 areas, as is evaluation of zoning and implementation of non-structural controls (see on-site system management program and land use controls).

--In areas not designated as problems areas, on-site system management and land use controls should be implemented.

--Septage treatment facilities are recommended for all towns except Barnstable and Chatham, which accept septage at their sewage treatment plants.

Criteria for 201 Studies

The following criteria for consistency between 201 plans and the 208 plan should be used in preparing the scope of work for Step 1 facilities plans, and in evaluating facility plan recommendations.



MAP 2.1

CAPE COD PLANNING AND
ECONOMIC DEVELOPMENT COMMISSION

The Needs Survey

The needs survey should include the following investigations:

--collection and mapping of site-specific septage pumping information for a minimum of one year.

--determination of the type and age of on-site systems in use in problem areas (from recent disposal permits, field investigation of the systems pumped during the study period, septage haulers' reports, and homeowner surveys).

--soils and water table data (from recent disposal permits, USGS water table and topographic maps) and additional borings as necessary to determine whether on-site disposal is technically feasible in problem areas.

--assessment of ground and surface water quality, with additional samplings to supplement 208 data in problems areas.

--field inspection of a minimum of 10% of failed systems reported within the study period.

Scope of Alternatives Evaluation

--The Step 1 facility plan must evaluate and develop alternatives to solve all problem areas indicated on Map 4.1 of the draft plan, but need not be limited to those problem areas.

--A decentralized abatement alternative must also be presented for proposed sewer service areas.

--An on-site system management program must be designed for all non-sewered areas.

--A minimum of two septage treatment alternatives should be presented: one assuming implementation of the sewer construction recommendations and one assuming selection of the non-sewered alternative. Regional septage facilities should be considered (see p. 2-38 for septage planning boundaries).

The degree of treatment and method of effluent disposal on Cape Cod must achieve the following goals to the extent possible:

1. Preservation of drinking water quality in groundwater resources within, or upgradient of, recharge areas for public water supply wells, areas dependent upon private water supplies, and within potential water supply development areas. (See Map 5.3, 5.4 and 5.6 of draft plan.)

2. Non-degradation of the coastal embayments or inland lakes and ponds by nutrient enrichment.

3. Non-degradation of existing high quality of coastal waters by direct or indirect discharge.

4. Maintenance of natural water table and pond water levels and prevention of saltwater intrusion; and

5. Return of resources, including fresh water, organic and nutrient materials to their natural cycles.

The following policies shall be the basis upon which 201 facility plans will be evaluated for consistency with the 208 plan.

1. All treatment systems shall incorporate septage treatment to the extent feasible.

2. Land disposal is the preferred disposal alternative.

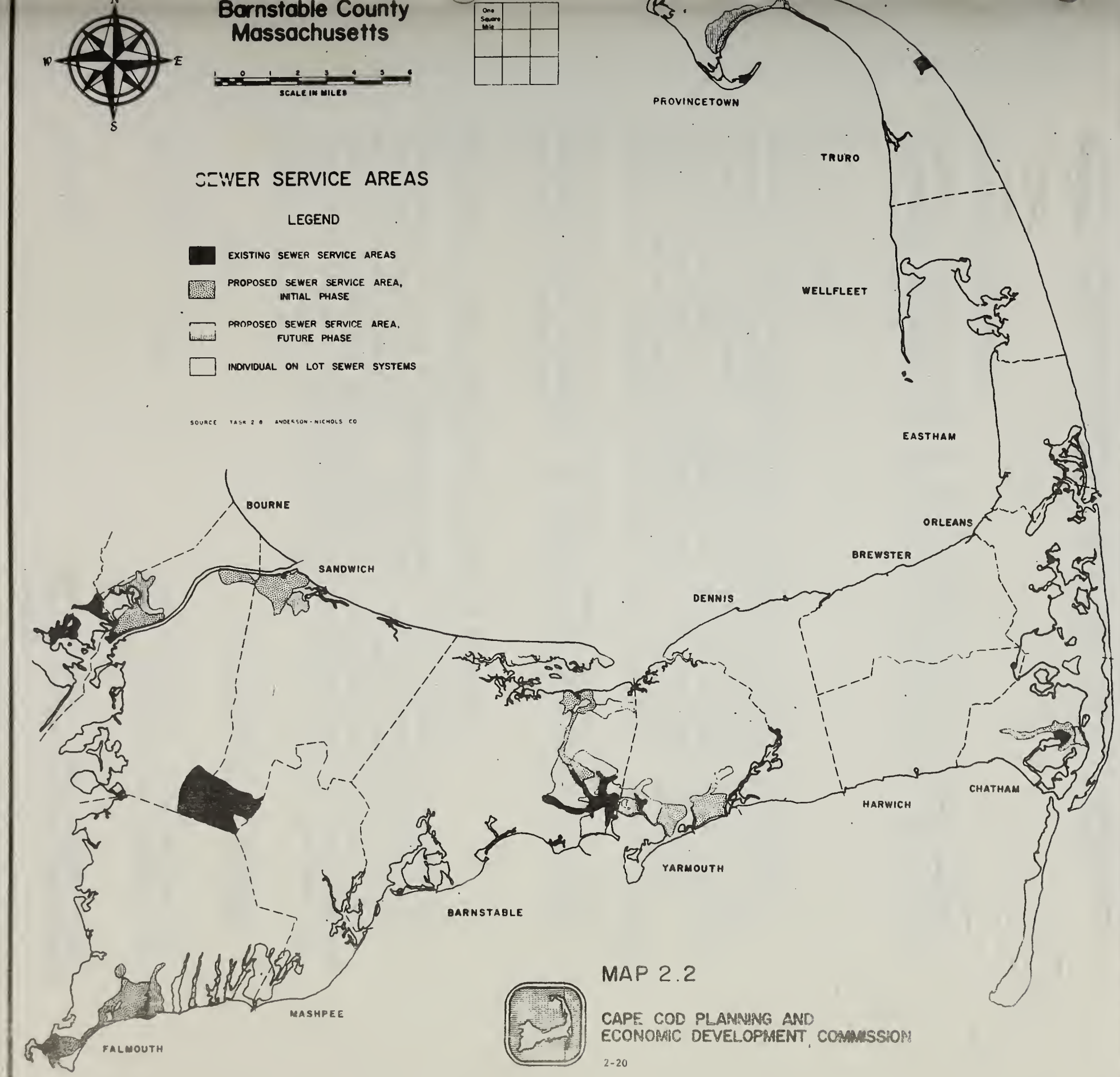
3. Spray irrigation is the preferred disposal method. Evaluation of land availability for spray-irrigation shall include golf courses, parks, greenbelts, highway and power line easements.

4. The following effluent limitations shall be applied: Within, or upgradient of, recharge areas for existing water supplies, private water supplies or potential water supply development areas (see 208 draft plan Map 5), effluent reaching the water table shall meet drinking water standards for all organic and inorganic chemical parameters except nitrate; the maximum concentration of nitrate shall be 5.0 ppm. All alternatives shall be compared for cost-effectiveness against spray irrigation which has been demonstrated to return water with nitrate concentrations of 2 parts per million or less to the water table. This requirement is considered to be consistent with Case 1 of EPA regulations (see "Water Quality Assessment" section).

5. Rapid infiltration following secondary treatment shall be permitted only where spray irrigation or other tertiary processes are not feasible, and where no pond, stream, or coastal waters will be adversely affected. Provisions for upgrading of treatment to advanced wastewater treatment processes shall be included in the facility plan, to be implemented in the event that disposal threatens water supplies or surface waters. Because of the integral relationship of groundwater with surface waters and coastal waters a Cape Cod rapid infiltration of primary treated effluent should not be allowed.

6. Evaluation of sites for rapid infiltration disposal shall include a minimum of two deep test holes to the depth of the assumed aquifer thickness or to the point at which a confining layer is encountered. Evaluation of mounding effects should include explanation of underlying assumptions regarding aquifer thickness, water table slope, lateral hydraulic conductivity and ratio between lateral and vertical conductivity. For each assumption the possible range of values should be stated and the effect of an improper assumption on the final result explained.

7. A monitoring system to test quality of leachate at the water table and to trace the movement of a leachate plume shall be installed and maintained at every disposal site. Design should be based on techniques presented in EPA manual titled "Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities" (Aug. 1977).



MAP 2.2

CAPE COD PLANNING AND ECONOMIC DEVELOPMENT COMMISSION

8. Selection of a treatment or disposal alternative which does not conform to these policies must be justified by detailed environmental assessment showing how the water quality goals will be achieved.

Population Projections

Population should be based on 208 program projections unless specific information is supplied by the engineer to substantiate a modification of these figures.

Flow Projections

Standard projections of per capita flows at 100 gcd are considered excessive. Winter water use rates should be evaluated and compared to nationally documented wastewater flows of 50-75 gcd (Alford, 1977) in projecting flows. Information on seasonal and year-round occupancy found in the report "Development Projections for Cape Cod" (1976) should also be taken into consideration. Infiltration assumptions should not be included in per capita flows, and should be substantiated.

Retro-fitting of water saving devices should be required by sewer use ordinance prior to hookup. No allowance should be made for increased per capita consumption.

Sewer Service Areas and Facility Planning Boundaries

Construction of new or expanded central sewer systems is recommended for seven towns and regions, under the "Limited Sewering" alternative described in the draft plan. Facilities planning boundaries for the sewering systems are indicated below. Additional considerations for septage treatment are also indicated. Sewer service areas are indicated in Map 2.2. Note: Non-sewered solutions should also be considered for "future phase" areas.

TOWN	FACILITY PLANNING BOUNDARY
Provincetown - Truro	Town boundaries, Provincetown and Truro. Must consider septage from Wellfleet.
Chatham	Town boundary. Must consider capacity to accept septage from southern Harwich.
Yarmouth	Town boundaries. Must consider septage from Dennis.

TOWN	FACILITY PLANNING BOUNDARY
Barnstable	Barnstable town boundaries. Must consider septage from Mashpee.
Falmouth	Town boundaries plus Otis Air Force Base. Must consider septage from Mashpee, Sandwich and Bourne.
Sandwich - So. Sagamore	Town of Sandwich, special water pollution abatement district to be formed to coincide with So. Sagamore Water District. Must consider septage from Mashpee and Bourne Village.
Buzzards Bay - Wareham	Buzzards Bay - special water pollution abatement district to be formed. Existing capacity at Wareham Treatment Plant to be utilized.

Table 2.3 presents a summary of proposed sewer facilities, flows, costs and comments on the status of current facilities planning.

TABLE 2.3

SUMMARY OF FACILITIES RECOMMENDATIONS

TOWN OR REGION TARGET DATE	EXISTING CAPACITY/ FLOW (MGD)	PROPOSED CAPACITY (MGD)	TYPE OF CONSTRUCTION PROJECT	TREATMENT AND DISPOSAL	PROJECT COST	COMMENTS	STATUS
Barnstable Step 2: 1979	Capacity 4.2 Existing flow 2.1	4.2	Extension of collection system to utilize capacity	Secondary/ rapid infiltration	*	A full needs survey should be conducted prior to construction of any collection systems other than in the 208 Sewer Service Areas or for any expansion of plant capacity.	Town has requested placement on priority list in 1979.
Buzzards Bay/ Wareham Begin Step 1: 1979	Capacity 1.8 Flow .23 (1979)	1.1 from Buzzards Bay	Buzzards Bay: New collection and transmission to Wareham	Secondary/ rapid infiltration	Collection only: $4,470,000 (ENR 2500)	Cost of Buzzards Bay share of treatment plant capacity would need to be negotiated. Wareham treatment plant is operating at only 15% capacity and it is not projected that capacity will be needed by Wareham in the foreseeable future.	No action at present. Wareham is scheduled to extend collection system towards Buzzards Bay in near future.
Chatham Begin Step 1: 1979	Initial capacity .44 mgd prior to modification Existing flow .14 Avg	*	Extend collection system, possible expansion of capacity	Secondary/ rapid infiltration	*	One aeration cell has been modified to pretreat septage. Existing capacity underutilized. 201 should address private well quality downgradient of disposal site.	Town engineers (Metcalf & Eddy) began scope of work in Sept. 1978.

TABLE 2.3 (cont.)

SUMMARY OF FACILITIES RECOMMENDATIONS

TOWN OR REGION TARGET DATE	EXISTING CAPACITY/ FLOW (MGD)	PROPOSED CAPACITY (MGD)	TYPE OF CONSTRUCTION PROJECT	TREATMENT AND DISPOSAL	PROJECT COST	COMMENTS	STATUS
Falmouth Step 2: 1979	.25	1.3	Upgraded and expanded collection system/treatment plant: septage facility	Secondary/ spray irrigation	$14,000,000 (ENR 2600)	Three alternatives are described in the draft facility plan: (1978): Ocean disposal, land application at Otis, & two-plant alternative. Outfall disposal does not meet goals of Clean Waters Act, and is not allowed by Ocean Sanctuaries Act. The alternative that meets 208 criteria is the Otis spray-irrigation alternative. (See Water Supply Management section for discussion of Otis as potential water supply area.)	Additional funds appropriated to complete facility plan on September 27, 1978.
Provincetown/ Truro Begin Step 1: 1979	None	2.0	New collection and treatment system	Tertiary/ land disposal	$12,099,000 (ENR 2500)	Critical water supply problems in North Truro and Provincetown warrant tertiary treatment for aquifer recharge & consideration of gray water/recycling. Weston & Sampson (1975) facility plan needs to be updated and revised to meet 201 criteria.	No action.

TABLE 2.3 (cont.)

SUMMARY OF FACILITIES RECOMMENDATIONS

TOWN OR REGION TARGET DATE	EXISTING CAPACITY/ FLOW (MGD)	PROPOSED CAPACITY (MGD)	TYPE OF CONSTRUCTION PROJECT	TREATMENT AND DISPOSAL	PROJECT COST	COMMENTS	STATUS
Sandwich/South Sagamore Step 2: 1979	None	.98	Collection and treatment	Secondary/ canal discharge	$7,200,000 (ENR 2500)	Step 1 facility plan for outfall completed prior to amendment of Ocean Sanctuaries Act prohibiting new outfalls. This alternative was selected through public participation process on the basis of environmental impact analysis indicating that low flow will have no adverse impacts. Implementation will require act of state legislature. Separate septage facility (regional) also under investigation.	Town Meeting action expected in October 1978.
Yarmouth Step 2: 1979	None	0.5-2.5	New collection and treatment systems/or regionalization with Barnstable. Possible separate septage facility.	Tertiary/ land disposal	*	Extensive development throughout town and scattered arrangement of public supply wells throughout town severely limit the availability of secondary treatment/infiltration sites. Advanced waste treatment is indicated at presently favored site "C." Regionalization with Barnstable for sewage is desirable. (over)	Environmental Impact Study to be completed in 1978.

TABLE 2.3 (cont.)

SUMMARY OF FACILITIES RECOMMENDATIONS

TOWN OR REGION TARGET DATE	EXISTING CAPACITY/ FLOW (MGD)	PROPOSED CAPACITY (MGD)	TYPE OF CONSTRUCTION PROJECT	TREATMENT AND DISPOSAL	PROJECT COST	COMMENTS	STATUS
Yarmouth (cont.)						EIS is expected to recommend substantial flow reductions from initially proposed 4.0 MGD facility, limiting service area to Rte 28. The 208 plan reserves concern for areas south of Rte 28 because of SC water quality in Lewis Bay. 208 sewer service areas have projected flow of 2.1 MGD as shown.	

*Cost or figure presently under study.

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ERRATA -- 208 FINAL PLAN

Please make the following corrections in your copy:

page 2-27 paragrapn 3. lines 6-10 should read:

As shown in the table, it would cost the average non-user $24 per year in taxes to amortize 100% of the collection system, for a total cost of $34 per year, while it would cost each user $293 per year in betterments for a total annual cost of $376.

Costs

As shown in Table 2.4 centralized sewering is very costly. While substantial support is available through state and federal funding, the local share is sizeable. The local share for the Falmouth facility plan, for example, is estimated at $3 million out of the total cost of $14 million.

On Cape Cod existing and proposed sewers have resulted in estimated costs to the user of $100 to $400 per year, plus an initial hookup of $500 to $1500. The costliness of sewers has been of concern to the EPA for several years, since a national survey revealed that sewering was costing $200 to $400 per year per user. EPA considers that the maximum bearable sewer cost is 1% of the user's median income ($65-$130/year nationally), EPA has also set strict policies that sewers must be demonstrated to be necessary and cost-effective in order to receive funding.

The Falmouth plan provides a good example of how costs break down per household. As can be seen in Table 2.4, the total annual cost to the user depends heavily on the method of apportioning the cost of the collection system between betterment assessments and the general tax rate. The town share of the treatment plant and transmission system is carried on the general tax rate. As shown in the table, it would cost the average non-user $16 per year to amortize 100% of the collection system, for a total cost of $34 per year, while it would cost each user $277 per year, for a total annual cost of $376.

Towns should seriously consider the public benefit derived from the abatement of odors, water pollution and public health nuisances, when fixing apportionments of betterment assessments. The 208 service areas have been selected to represent the minimum investment in centralized sewers in order to avoid excessive costs. These will be further refined by 201 studies. Since limited sewering is recommended in this plan, substantial relief to the user could be provided through a modest investment on the part of the general taxpayers. It is hoped that towns, the state and EPA will make a serious commitment to funding the needed systems at reasonable costs to the user in order to achieve the regional and national water quality goals.

TABLE 2.4

ANNUAL SEWER COST TO TYPICAL HOUSEHOLD
(Capital and Operation and Maintenance Costs showing alternative betterment assessments for collection systems)

		WITHIN SEWERED AREA*				OUTSIDE SEWERED AREA**			
Portion of Collection System Applied to Tax Rate	Increase in Tax Rate Per $1000 Valuation	Property Tax	User Charge	Better-ment	Total Annual Cost	Property Tax	Septage Disposal	Better-ment	Total Annual Cost
100	3.00	24	75	0	99	24	10	0	34
50	2.00	16	75	146	237	16	10	0	26
0	0.95	8	75	293	376	8	10	0	18

*Typical household within sewered area
1. residence market value $40,000
2. 80-ft frontage
3. water use about 12,000 cu ft/year

**Typical household outside sewered area
1. 1,000 gallons of septage pumped every 4 years
2. pumping charge $25
3. treatment charge $12.50

Source:

Preliminary draft of facility plan for Falmouth, 1978
Camp, Dresser & McKee

FEDERAL ACTION

1. The EPA Construction Grants Division should support implementation of the 208 plan by adopting the funding policies set forth in this section. The EPA should monitor the implementation of 201 funds by DWPC to assure consistency.

2. The EPA Water Quality Branch should continue to utilize technical assistance of USGS in reviewing the impacts of proposed sewer facilities on the groundwater resources of Cape Cod.

STATE ACTION

1. The Division of Water Resources should recommend to the Governor designation of all Cape Cod towns and the Water Pollution Abatement Districts as recommended in Table 2.3 as wastewater management agencies, eligible to receive 201 grants for construction of treatment work.

2. The Division of Water Pollution Control should adopt and implement on Cape Cod the criteria for 201 studies set forth in this section.

3. The DWPC should give funding priority to the projects listed in Table 2.3 when 201 applications are made by the towns and districts.

4. The Director of DWPC should recommend to the Water Resources Commission the formation of Water Pollution Abatement Districts in Buzzards Bay and South Sagamore for the purpose of implementing the plan recommendations.

5. The Division of Water Pollution Control should utilize 201 funds to provide the maximum incentive to towns to abate pollution, to protect water quality and to assure consistency with 208 adopting the following funding policies for the Cape Cod region:

a. Construction of sewers should be limited to those areas for which there is no other cost-effective solution to existing public health or water quality problems.

b. Construction projects must be determined to be consistent with the 208 plan through the regional A-95 review process.

c. No construction grant shall be awarded for a project that does not include implementation of an abatement alternative for all Category 1 areas and septage treatment facilities for the entire town.

d. Sewer construction in areas not recommended for sewering in a 208-approved 201 facility plan shall not receive funding within the planning period of that facility plan unless the applicant can demonstrate a good faith effort to implement the recommended non-sewered alternatives to prevent development of sewer needs.

e. These policies shall be applied to all projects which have not reached Step 3 at the time of certification of the 208 plan.

6. The DWPC should assume responsibility for coordination with 208 by notifying the CCPEDC, as the designated areawide planning agency, of all meetings dealing with 201 applications from Cape Cod towns and by sending copies of all 201-related correspondence, to the 208 agency. The DWPC should require all applicants to forward copies of all correspondence, consultant contracts, and draft and final reports to the 208 agency. Draft priority lists should be sent to the 208 agency for review prior to finalization.

7. DEQE should implement 208 recommendations and coordinate with the 208 agency in permitting of subsurface disposal systems and septage treatment facilities. DEQE should notify the 208 agency of all applications for subsurface disposal permits for systems over 15,000 gal/day and all proposed septage facilities.

REGIONAL ACTION

1. The CCPEDC, as the designated 208 areawide wastewater management planning agency, should provide technical assistance to the towns in making application for 201 funds, and should serve as a regional coordinator of 201 planning efforts to assure consistency with the 208 plan.

2. The CCPEDC should assign to the Cape Cod Water Resources Advisory Council the responsibility of working with the water quality staff to develop a determination of consistency between completed 201 facility plans and the 208 plan and to make annual recommendations to the DWPC on facility needs for inclusion in the DWPC Construction Grants Program Priority List.

LOCAL ACTION

1. The seven towns and regions listed in Table 2.3 should complete 201 facilities plans and construct the recommended facilities within the first five years of implementation.

2. The town of Bourne should form water pollution abatement districts in Buzzards Bay and South Sagamore.

3. Towns should seek assistance of the 208 planning agency in making application for 201 funds, and should maintain close contact with the 208 agency throughout the planning process.

4. In constructing a sewer system, towns should coordinate with Mass. DPW road construction projects.

5. Town water quality advisory committees should fully participate in the 201 planning process to assure a coordinated approach and the development of a publically acceptable facility plan. They should forward the completed facility plan to the Regional Water Resources Advisory Council with comments to be taken into consideration by the council in determining its consistency with the 208 plan.

6. Town water quality advisory committees should meet annually to review 208 sewer service areas and recommend revisions to the Regional Water Resources Advisory Council.

Neighborhood Solutions & Septage Facilities

Towns with substantial Category 2 problem areas should be encouraged to apply for Step 1 funds to evaluate decentralized alternatives including on-site system rehabilitation, neighborhood treatment systems and septage treatment facilities. All of these facilities, exclusive of lateral collection systems, are grant eligible under the Clean Waters Act of 1977, provided that homeowners are year-round residents.

Facility planning for decentralized solutions is a relatively new concept. In general, the Step 1 for a decentralized approach will represent a larger portion of the total project cost than for a major sewer construction project. Recent estimates have indicated costs between $50,000-$100,000. Table 2.5 indicates towns with large Category 2 problem areas warranting a 201 facilities plan for decentralized solutions.

Scope of Facility Plan

The 208 plan should be used as a basis for the Step 1 study, with the designated problem areas receiving the most attention. The problem area screening process described in the draft plan and summarized in Table 2.6 should be employed, and further information should be obtained for the problem areas including the following:

- --site specific septage, soils and water quality information for problem areas as described for sewer facility needs survey.

- --determination whether on-site system rehabilitation and upgrading to septic tanks meeting Title 5 soil and water table requirements can abate the failures, including possible use of communal septic tank systems.

- --comparison of sewered solutions for part or all of Category 2 problem areas, including small-diameter collection systems, and rehabilitation of individual and communal septic tank systems.

- --general recommendations for rehabilitation of on-site systems in non-problem areas including recommended on-site system management and non-structural controls.

- --comparison of septage treatment design capacities necessary for different pump schedules and recommendation of maintenance pumping schedule for chosen alternative.

- --design of septage treatment facility with capacity to handle local and regional flows. (See Table 2.7)

Septage Flow Projections

Septage flows should be projected on the basis of on-site system rehabilitation and a maintenance pumping program. While present flows from failures must be taken into consideration, straight-line projection of present flows is not acceptable.

Any method of projecting septage flows will be complex since a number of factors must be taken into consideration.

TABLE 2.5 NEIGHBORHOOD SOLUTIONS NEEDS

(Towns with Major Category 2 Problem Areas; towns in which 201 facility plans should be prepared evaluating decentralized systems in addition to septage facilities.)

TOWN	#	PROBLEM AREA	FLOW	COMMENTS
Barnstable	11	Craigville	160,800	Full needs study is necessary prior to construction grants for these areas, even though they may have been covered by original sewer plan.
	6	No. of Wequaquet Lake	151,200	
Bourne (Village)	8,12	Along Rte 28 from Waterhouse Rd. to Barlows Landing Rd.	112,700	Town prefers to solve problems in Buzzards Bay and South Sagamore through water pollution abatement districts; Problems in Bourne Village to be solved through local action. Town has no plans to enter 201 for these areas.
	13	Along Rte 28 northeast of Flax Pond Rd.	72,200	
	1	Monument Beach	73,300	
Dennis	1	South of Lower County Road	659,600	Highly seasonal population in this area. Town is handling problem at present by on-lot rehabilitation.
Harwich	1	South Harwich	183,000	Town has indicated intention to handle problems by rehabilitation.
	3	Harwichport	171,700	
	10	West Harwich	147,800	
Orleans	1,2	Orleans Center	195,000	A scope of work for this project was submitted in September, 1978.
Wellfleet	1	Wellfleet Center	143,500	Town has made no comments indicating what action will be taken.

TABLE 2.6

SCREENING WASTEWATER MANAGEMENT METHODS IN PROBLEM AREAS (For explanation, see draft plan Chapter 4)

Method considered: Feasible (+) Infeasible (-) Temporary (T)

PROBLEM CONDITION	ST[1] - PIT	ST - SAS[2]	ST - MOUND	WASTE SEGREGATION	HOLDING TANK	FLOW REDUCTION	SM. DIAMETER GRAVITY SEWER	PRESSURE SEWER	VACUUM SEWER	LG. DIAMETER GRAVITY SEWER	COMMENTS
SOILS - Low Permeability											
Perk more than 30 min.	-	-	-	-	-	+	+	+	+	+	New systems prohibited by Title 5
Perk more than 60 min.	-	-	-	-	-	+	+	+	+	+	208 recommended maximum for rehabs[3]
Shallow depth to impermeable soils											
Less than 4' naturally occurring permeable soils	-	-	-	-	-	+	+	+	+	+	New systems probibited by Title 5
Less than 3' naturally occurring permeable soils	-	-	-	-	-	+	+	+	+	+	208 recommended minimum for rehabs[4]
SITE - Lot Size											
Avg. lot 2 Acres or more	+	+	+	+	-	+	+	+	+	-	Gravity sewers prohibitively expensive
Avg. lot ½ - 2 Acres	+	+	+	+		+	+	+	+	+	Cost effective analysis critical
Avg. lot less than 1 Acre	+	+	+	+	-	+	+	+	+	+	Discard private wells if water quality problems are present
Avg. lot ¼ - ½ Acre	+	+	+	+	T	+	+	+	+	+	Technical feasibility of on lot systems depends on soils
Avg. lot less than ¼ Acre											ST-Pit feasibile if soils very permeable -
-Depth to W.T. more than 10'	+	-	-	+	T	+	+	+	+	+	Water quality impact probably very adverse
-Depth to W.T. less than 10'	-	-	-	-	T	+	+	+	+	+	Sewering indicated; gravity collection probably most cost-effective

TABLE 2.6 (cont.)

Method considered: Feasible (+) Infeasible (-) Temporary (T)

PROBLEM CONDITION											COMMENTS
TOPOGRAPHY - Slopes											
Greater than 1:3 (33%)	-	-	-	-	-	+	+	+	+	+	Discard ST-SAS, ST - Mound
Irregular, hilly topography which would require deep cuts or numerous lift stations	-	-	-	-	-	+	-	+	-	-	Discard small diam. and convent. gravity sewers & vacuum sewers
GEOLOGY-HYDROLOGY											
Shallow bedrock	-	-	-	-	-	+	-	+	+	-	Discard gravity sewers
Unstable soils	-	-	-	-	-	+	-	+	+	-	Discard gravity sewers
High Water Table:											
Less than 6' below surface	-	-	+	+	T	+	+	+	+	+	Discard ST-SAS
Less than 2' below surface	-	-	-	-	T	+	-	+	+	-	Discard gravity sewers because of infiltration & construction problems

1. ST - Septic tank
2. ST - SAS. Septic tank with soil absorbtion system includes pit, chamber, trench, gallery, field, etc.
3. For rehabilitation in problem areas it is recommended that consideration be given for a variance to allow construction of a leach field in soils where perk rate is less than 60 min/in provided that dosing and dual field techniques or FULDO's concept are employed and water conservation devices are installed.
4. Engineering standards in other parts of the country allow construction in 3' of permeable soils. Variance for rehabilitation recommended to allow mounded system under these conditions, with water conservation, dosing and dual field or FULDO's concept.

1. The present source of septage is almost exclusively emergency pumping from failing cesspools. Commercial establishments are major contributors. With the implementation of abatement measures including sewering this source should be substantially reduced.

2. The number of septic tank systems being pumped for maintenance purposes will gradually increase, generating additional flows.

3. A town-mandated pumping schedule may control the timing of maintenance pumping, thus controlling peak flows and eliminating the need for facility overdesign.

4. The maintenance pumping schedule must be designed to accommodate the average sizes of systems in use and type of use which vary from town to town.

Draft Chapter 4 recommended that towns explore several pumping schedules. The Step 1 facility plan should analyze the alternatives and recommend the optimum pumping schedule for the on-site system management program.

Table 2.7 shows projected flows for all Cape Cod towns, assuming that sewers are installed in the proposed service areas. 1978 flows based on a telephone survey of dump operators and boards of health, are provided for comparison. Projected flows are based on the following assumptions:

--Four people live in each dwelling unit.
--Each dwelling unit is served by a 1,000 gallon septic tank.
--The winter population has its septic tanks pumped every two years.
--The summer population has its septic tanks pumped every four years.
--The peak septage production period is spread over 2 months in the summer.
--75 percent of the summer population has its septic tanks pumped during the peak period.
--25 percent of the winter population has its septic tanks pumped during the peak period.
--With regards to industry, 30 gallons of septage are produced per employee per year.

(FROM: Task 2.8 Wastewater Management Solutions for Cape Cod, Anderson/Nichols Company, 1976)

It is recommended that the 208-generated flows be used for design of regional septage facilities for towns not covered by a Step 1 needs survey. Since septage planning is a relatively new field, the 208 agency should assist towns in refining the methods of septage flow projection through the ongoing planning program.

Septage Treatment and Disposal

Septage is presently accepted at the Barnstable sewer treatment facility, and will be accepted at Chatham's treatment plant when modifications are completed late in 1978. The remainder of the Cape Cod towns dispose of septage in open pits at the town disposal area, or in lagoon systems.

Disposal of septage in open pits is illegal under both state and federal laws, and lagoons are approved only on an interim basis by DEQE, until more advanced methods are proven to be feasible and reliable.

Improper treatment of septage results in severe odor problems, groundwater contamination and the production of large amounts of offensive sludge which must be landfilled. Handling of the material can itself pose a health hazard.

Table 4.2 of the draft plan presents costs, advantages and disadvantages of a number of septage treatment processes, but leaves the selection of the appropriate method to towns and their consultants. During the review period, however, local officials and citizens have requested stronger guidance from the 208 plan. The following sections present general considerations and specific recommendations on septage treatment methods.

General Considerations

1. The treatment and disposal method should not threaten groundwater quality

Cape Cod is an area with unique problems to be addressed in selecting a septage treatment method. Since groundwater is the sole source of drinking water, any method which threatens groundwater quality would be undesirable. As shown in Table 4.2 , almost every method poses some degree of threat to groundwater quality. The least impact is apparently created by composting. The most serious threat is probably posed by super-chlorination, which has recently been shown to produce carcinogenic by-products. All land treatment methods fall in between these two, causing undesirable nitrogen contamination in amounts proportionate to the rate of loading.

2. The treatment method should not produce offensive odors

On Cape Cod, where development is encroaching upon existing disposal sites and open space is rapidly being consumed, odor is a serious consideration in septage treatment. All anaerobic processes produce offensive odors. Abatement of odors is provided by lime stabilization or composting. Lime stabilization raises the pH of the septage, to a point which inhibits production of most offensive gases. Lime also improves the dewatering (separation of solids and liquids) characteristics, and kills pathogens. Large amounts of lime are necessary, however, and groundwater contamination will result from disposal of both solids and liquid products. Composting, being an aerobic process, produces odorless carbon dioxide and water vapor.

3. The treatment method should provide for resource recovery

Most of the treatment methods listed in Table 4.2 produce a solid sludge that needs to be landfilled. Only composting and land spreading return the organic material and nutrients to the soil. Land spreading is not acceptable on Cape Cod because of groundwater considerations. The final product of composting can, however, be used as a soil conditioner and fertilizer.

4. Towns should avoid technologically sophisticated systems

Although a very high degree of treatment can probably be achieved through advanced physical/chemical processes, towns should be cautious about selecting a method which uses complex mechanical systems or expensive and dangerous chemicals. The more sophisticated a system is, the higher the operation costs will be and more vulnerable it will be to breakdown. While it is hoped that regionalization will ensure skilled operation and better monitoring of treatment facilities, it must be realized that Cape Cod is a remote area and most of the small communities do not have chemists and engineers in town hall.

From this perspective, lagoons and land treatment are the most desirable systems, and chemical oxidation is undesirable. Anaerobic/aerobic treatment is desirable only at a sewage treatment plant which already is required to have a trained operator. Composting requires use of an air pump and/or a bulldozer to aerate piles, but is otherwise a simple process. Pretreatment and dewatering, as proposed for the Rehoboth, Ma. system would complicate the process, but not to the extent that it should be eliminated.

Recommended Treatment Methods

The following recommendations are based on the four major considerations stated above.

1. Towns should not make major investments in lagoon systems

Several communities which have been ordered by DEQE to cease illegal dumping of septage have constructed "interim lagoons." These are anaerobic lagoons, which have been approved by DEQE on an interim basis until better methods have been proven reliable. Lagoons offer little improvement over open pits, causing serious groundwater pollution and odor problems.

Lagoons have been reported to cost between $18,000 and $49,000 to construct. For comparison, the local share of a tri-town composting system, with federal and state funding,will probably average $30,000 for each of the three towns. Since the state has now approved two different septage treatment facilities (an anaerobic/aerobic system for Wayland/Sudbury in addition to the Rehoboth composting plant) there is no longer justification for such expenditures for short-lived and inadequate solutions.

Towns should deal with odor problems by liming septage pits and lagoons to a pH of 8.5 or by adding odor masking agents and proceed with plans for proper treatment facilities.

2. Wherever possible, septage should be treated at sewage treatment plants

Septage can be pretreated and "bled" into treatment plants at a rate of 1%-5% of the sewage flow. The utilization of tried and proven technology favors this approach. Except where severe access problems might result, as could occur with the proposed Provincetown treatment plant, all future sewage treatment plants over 100,000 gal/day capacity should be adapted to accept septage. The cost of treating septage at treatment plants is estimated at $15.00 per 1,000 gallons treated.

3. Composting is the method of choice for separate septage facilities and should be given priority consideration

In the composting process, septage is mixed with a carbon source, usually woodchips and sawdust, and piled in windrows. Aeration is provided by pipe circulation systems or by mechanical turning of the piles. The heat produced by microbial action kills pathogens giving off carbon dioxide and water vapor. Because it is an aerobic process, composting does not create odor problems. The final product, following proper treatment can be used as a soil conditioner for cultivation of non-food crops. A small amount of liquid effluent is produced.

A pilot composting system was tested in Rehoboth, Ma., and the DEQE has approved a modified composting process for the Rehoboth/Swansea/Seekonk region. The proposed project would provide chemical pretreatment to ensure 100% pathogen kill, and mechanical dewatering to improve handling. The liquid effluent will be treated by spray irrigation.

The projected cost for a 25,000 gal/day average capacity (peak 42,000) is $850,000. (Pio Lombardo Associates, telephone conversation) Projected operating costs at $10. per 1,000 gallons treated make this a very attractive system. The project has been approved as eligible for state and federal construction grants.

The availability of sawdust and woodchips for composting on Cape Cod needs to be further investigated. Importation of sawdust could increase the operating costs. Waste brush is presently chipped in several towns. A coordinated program, possibly involving regional sharing of a chipper, could possibly facilitate composting and alleviate a major solid waste disposal problem posed by brush.

4. Towns should join together to construct regional septage facilities

A regional approach to septage facility construction is recommended for the following reasons:

-- All septage treatment methods currently available pose some potential threats to groundwater quality. Regionalization would minimize the number of potential pollution sources.

-- Regionalization would render the utilization of full-time trained operators more cost-effective. A problem frequently encountered with small treatment plants is that trained operators are retained on a part-time basis, leaving the plant in the hands of untrained personnel most of the time. Greater supervision of treatment facility operation by DEQE would also be possible under a regional approach.

-- Groundwater monitoring systems would be more cost-effective for regional systems. It is unlikely that a groundwater monitoring system would cost any more for a regional facility than one serving a single town. Since the monitoring system is a substantial expense (one for Orleans is estimated to cost $28,000) there is a direct economy of scale with regionalization.

Septage Facilities Needs

Septage capacities at existing sewage treatment facilities and regional needs are summarized in Table 2.7 . A discussion of considerations in designating septage regions is found in draft Chapter 4.

Costs

Costs of decentralized solutions for Category 2 problem areas can range from $1,000 to $3,000 initially per user. This includes rehabilitation of on-site systems, installation of communal septic systems, or small neighborhood sewers with secondary treatment. No federal funding is assumed in this discussion, although these systems are eligible under federal regulations.

Total user costs can range from $20 per year for a home on a septic tank system, including septage treatment, to $150/year for a homeowner on a neighborhood system.

Septage costs include the local share of construction, which might range from $30,000-$50,000, assuming federal grants. (Total cost of $750,000-$1,000,000 for a regional facility.) Operation and maintenance of septage facilities averages $10-$15 per 1,000 gallons treated. Amortization, operation and maintenance for septage facility alone would range from $2-$10 per year, per household, assuming a 3-year pumping schedule is implemented. The cost would be in the lower range if federal funds are received.

TABLE 2.7

SEPTAGE FACILITY NEEDS

TOWNS IN SUBREGION	ESTIMATED PRESENT FLOW	1995 SUBREGIONAL PEAK FLOWS* (assuming sewering of proposed service areas)	CAPACITY AT STP	ADD'L SEPTAGE CAPACITY NEEDED	COMMENTS
Buzzards Bay & Wareham	--	Not Available	Not Available	--	Most of Buzzards Bay is projected as a sewer service area. New septage capacity in Wareham should be adequate to handle remaining flow.
Sandwich	10,000-11,000	15,600	15,500	--	Several possibilities exist for this large region, depending on the outcome of the Falmouth and Sandwich sewer construction projects. The Sandwich facility could probably handle all septage from Sandwich. The site, at the Cape Cod Canal, would probably be of limited accessibility to the other three towns. Sandwich, Bourne and Mashpee have had preliminary discussions about a regional facility at Otis AFB. If Falmouth develops a sewage treatment facility at Otis, a 4-town region may be feasible. It is recommended that these four towns form a joint committee to evaluate regional aspects of current 201 facility plans and to assess the need for a separate regional septage facility.
Bourne	5,800[2,3]	23,000			
Mashpee	2,000[3]	16,900			
Falmouth	15,000 Peak	46,000 101,500	52,400 67,900	33,100	
Barnstable	20,000-24,000	46,200	58,500	(See Bourne Falmouth Mashpee region)	Barnstable should make arrangements to accept septage from Mashpee to the extent of the capacity of the treatment plant.

TABLE 2.7 (cont.)

SEPTAGE FACILITY NEEDS

TOWNS IN SUBREGION	ESTIMATED PRESENT FLOW	1995 SUBREGIONAL PEAK FLOWS* (assuming sewering of proposed service areas)	CAPACITY AT STP	ADD'L SEPTAGE CAPACITY NEEDED	COMMENTS
Yarmouth	52,000-60,000	29,900[6]	55,500[6]	--	It was recommended in the draft plan that these four towns form two septage regions--Dennis/Yarmouth and Harwich/Chatham. This was based on the assumption that with future increased flows Chatham's wastewater facility would be capable of accepting at least part of Harwich's septage, and that Yarmouth would build either combined or separate septage and sewerage facilities. The feasibility of this regional plan will not be known until the EIS on the Yarmouth project has been completed (late 1978) as well as a Step 1 facility plan currently being initiated in Chatham. It is recommended in the "Sewer Construction Projects" section that the potential for serving as regional septage treatment sites be considered in these planning efforts. Dennis and Harwich should keep abreast of, and participate in, these projects to the extent possible. In the event that the recommended regional solutions do not appear to be feasible within a reasonable time, (late 1979) Dennis and Harwich should initiate a facility plan for a regional septage facility for themselves.
Dennis	20,000	43,800	--		
Harwich	10,000-11,000	26,000	--		
Chatham	6,000-12,000	14,100	15,500[7]		
		113,800	71,000	42,800	
Eastham	1,000	17,600	--		Orleans has been encouraged to pursue its Step 1 to construct this regional facility. It is the best location to serve the three towns because of the linear arrangement of the lower Cape towns. A scope of work is presently under development.
Orleans		14,000	--		
Brewster	3,800[4]	24,000	--		
		55,600		55,600	

TABLE 2.7

SEPTAGE FACILITY NEEDS

TOWNS IN SUBREGION	ESTIMATED PRESENT FLOW	1995 SUBREGIONAL PEAK FLOWS* (assuming sewering of proposed service areas)	CAPACITY AT STP	ADD'L SEPTAGE CAPACITY NEEDED	COMMENTS
Provincetown	60,000	2,800	40,000		A sewer system built in Provincetown or North Truro could probably accept all of the septage produced in this region. Severe access limitations during the summer traffic on Route 6 may very well make such a regionalization unfeasible. An alternative would be a separate septage plant for Wellfleet and Truro. These two towns should pursue an earlier offer by the North Truro Air Force Base of assistance in funding a regional system.
Truro	20,000-25,000[5]	12,800			
Wellfleet	2,000-3,000	15.800			
		31,400		28,600	

1. Based on telephone surveys of boards of health and disposal area staff.
2. Based on total truckloads received in month of July 1978 divided by 30 days and multiplied by 1000 gal. truck.
3. Divided monthly total by 30.
4. Will be less for 1978 season, major failed system has been rehabilitated.
5. Laundromat discharges 10,000/day.
6. Based on 208 draft plan sewer service areas. EIS may recommend more limited sewering, resulting in substantially higher septage flows and lower capacity at STP.
7. Based on 208 projections of sewage flow. This figure does not reflect present capacity due to modification of Chatham STP.

STATE ACTION

While the initiative to construct septage treatment facilities has occasionally originated locally, the implementation of a regional septage management scheme depends heavily upon supportive actions from regulatory and funding agencies. Specifically:

1. EOEA should develop a septage treatment policy to guide towns and DEQE in selection of adequate septage treatment methods.

2. DEQE should support regional efforts to establish septage facilities through its regulatory powers. Orders to abate dumping at landfills should be issued in such a way as to encourage regional treatment facilities rather than town-by-town construction of anaerobic lagoons. For example, groups of towns in proposed septage regions should be placed under orders at the same time. Once a Step 1 facility plan for a regional facility has been completed, DEQE should order all towns in the region to institute septage treatment and not renew lagoon approvals.

3. DWPC should give priority to funding of septage facilities for regional treatment plants through 201 grants to one lead town. Funding eligibility should be based on the following conditions:

-- A complete needs survey should be performed in the lead town. Neighborhood systems and on-site system upgrading should also be grant eligible in the lead town.

-- For other cooperating towns in the region, DWPC should accept 208 information as satisfying Step 1 requirements for the septage facility, providing that there are no Category 1 sewer needs in those towns.

-- Neighborhood systems and upgrading in the other towns would not be grant funded unless a 201 Step 1 with complete needs assessment is subsequently performed in those towns.

-- Septage flows for the cooperating towns will be developed by the towns and 208 agency through a technical assistance program.

It is recommended that towns with Category 1 sewer needs be lead agencies.

4. DWPC should reserve construction funds for non-sewered projects including on-site systems and neighborhood collection and treatment systems in the towns listed on Table 2.5.

REGIONAL ACTION

1. The CCPEDC's Solid Waste Advisory Committee, which is concerned with the problem of septage disposal, should explore legal/institutional arrangements and support applications by subregions for federal funds, with the assistance of the 208 planning staff. A formal coordinative mechanism between this committee and the Water Resources Advisory Council should be established.

2. CCPEDC through its model on-site system management program, should demonstrate a model Step 1 procedure for evaluating decentralized solutions.

LOCAL ACTION

1. Towns should join a regional effort to develop septage treatment facilities. With the assistance of the 208 planning staff towns should apply for funds to construct regional systems as described in Table 2.7.

2. Towns indicated in Table 2.5 "Neighborhood Solutions Needs" should apply for Step 1 funds to develop decentralized solutions for large Category 2 problem areas and implement on-site system management in the rest of the town.

On-Site System Management

Failure of on-site sewage disposal systems has been identified as the major wastewater management problem on Cape Cod. The draft plan explored in detail several alternative management schemes, with emphasis placed on proper installation techniques and town-enforced maintenance of septic systems.

Comments have been received from many sources indicating that greater emphasis should be placed on the identification and upgrading of failing systems. Concern has been expressed, however, over the legal aspects of such a program. Legal considerations were also raised about the enforcement of a maintenance program, and several comments were made about the inadequacy of existing septage facilities to receive additional flows from maintenance pumping.

Many comments and discussions throughout the review period have led to greater emphasis on local and state enforcement capabilities. It has also become evident during the review that an education program is crucial to adoption of recommended actions on the local level.

The following on-site system management program represents a substantial revision in response to these comments.

STATE ACTION

1. DEQE should consider a regulatory mechanism for assuring that health agents and inspectors are qualified to implement subsurface disposal regulations. The fundamental recommendation of the 208 plan to improve on-site system management practices is that all towns should have a registered sanitarian for a health agent. It has been pointed out earlier, however, that not all registered sanitarians have training and experience in soils sciences and sanitary waste disposal methods. Further, health agents frequently rely on field inspectors who have only on-the-job training. A regional training program on Title 5 and techniques of on-site system installation and maintenance is recommended below. The DEQE should consider regulations or legislation that would require that all agents of the board of health involved in implementing Title 5 be required to complete an adequate training program.

2. DEQE should review information in the Draft 208 Plan and revise Title 5 requirements in the following areas:

a. Timing of soils tests--consider restrictions of soil tests to wet months.

b. Water table determinations--based on USGS project to develop a method of correcting observed water table readings.

c. Compost toilets--Evaluate the operation of humus toilets in Massachusetts to date and reconsider requirements on burial of compost.

d. Maintenance--revise recommendation that tanks be pumped annually to require regular maintenance, when tanks are 1/3 full of sludge.

3. The DEQE District Engineer should exercise his authority to implement Title 5 and to abate nuisances. The 208 program recommends that immediate action is necessary in Category 1 problem areas to abate septic system failures, and resultant water quality and public health nuisances. DEQE should take appropriate actions to require the upgrading or replacement of failing systems if local efforts fail to make progress towards abating these problem within the first two years following certification of this plan.

4. The Secretary of Environmental Affairs and the legislature should seek and appropriate adequate funds for DEQE to investigate problem areas and enforce Title 5 in the Cape Cod area. Additional personnel at the Southeast Regional District Engineer's office in Lakeville is necessary to provide adequate enforcement as described above.

5. DEQE should investigate and recommend control of chemical septic system additives. Reports have been received by 208 staff and health officials in other areas of trees being killed, homeowners and septage haulers being burned, household fixtures and flooring being damaged and private wells being affected by the use of acids. Long Island health officials report having found chlorinated hydrocarbons and petroleum distillates contained in one product in groundwater and public supply wells. They are conducting field tests in 1978-79 on this product. It is generally known that they do not provide a long term solution.

No effective legal control mechanism appears to exist. Legislation will probably be necessary to bring them under control. When, and if adequate evidence is assembled, action by the Attorney General on the basis of nuisance may be possible. Local boards of health could possibly control use on the basis of its being a "repair" requiring a permit under Title 5.

DEQE should collect all existing data and conduct necessary field tests to substantiate ineffectiveness and water quality hazards and work with the Department of Public Health, the Executive Office of Environmental Affairs, and the Attorney General's office to develop and implement necessary control measures.

6. DEQE should recommend legislation to increase town board of health authority to require upgrading and mandatory pumping.

REGIONAL ACTION

While the authority to enforce on-site system management recommendations lies at the town level, considerable technical assistance should be provided to the towns by the regional 208 agency (CCPEDC) in coordination with the County Health Department.

1. CCPEDC should conduct a demonstration on-site system management program. Using implementation funds, CCPEDC should hire a sanitary engineer to work in two cooperating towns to evaluate problem areas designated by 208 and to help set up an on-site system maintenance program. Technical aspects of field investigation, determination of failure, development of abatement measures and projection of septage flows should be demonstrated. Model regulations to improve Title 5 enforcement based on experience with local conditions should be prepared.

2. County Health sanitarians should continue to provide services to local boards of health in Title 5 enforcement and problem investigation in coordination with the 208 program. A Memorandum of Understanding should be drafted for CCPEDC and County Health to coordinate local assistance and conduct demonstration programs. County Health sanitarians should coordinate their efforts in Title 5 related activities with the 208 program by supporting and implementing the 208 recommendations.

3. CCPEDC should assist towns in seeking funds for on-site system rehabilitation. Several grants and loan programs under U.S. Department of Housing and Urban Development are potential sources of funds for low income families to repair and upgrade on-site systems. These include grants to towns through the Community Block Grants Program, to housing authorities through Section 312 Housing Rehabilitation Loans and to individuals through Farmers' Home Administration Section 502, Low and Moderate Income Housing Loans, Section 504, Very Low Income Housing Loans and HUD Section 200K Guaranteed Loans.

The strict eligibility requirements and generally low funding levels of these programs could limit the applicability of these funding sources on Cape Cod. Staff of the CCPEDC should continue their efforts to assist towns in applying for funds.

On-site systems are also eligible for funding under the 1977 Amendments to the Clean Waters Act as part of a comprehensive 201 facility plan. It is required that the town guarantee that the systems will be properly maintained. This could be accomplished by direct town maintenance (through a contract with septage haulers) or possibly by contract with the homeowners. The 208 planning program and Water Resources Advisory Council should make every effort to influence the Division of Water Pollution Control to give due consideration to allocating funds for on-site system rehabilitation where this is the cost-effective solution.

Another potential means of financing is the Betterment Act (MGL, Ch. 80). The abatement of pollution and public health nuisances would be the "public use" derived from such use of local funds. Through this act local funding might be used to upgrade on-site systems. The cost would then be assessed to the owners as a betterment assessment over a period of years. It is likely that the town would have to obtain an easement to construct the system on the property, and that the system would then be owned by the town. The system could either be maintained by the town or by the owner under contract to the town. There is no known precedent for such use of betterment assessments in Massachusetts. Technical assistance from CCPEDC should be provided to towns in further researching and implementing this approach.

Requesting the Division of Water Pollution Control to form a water pollution abatement district is another possible funding route, which would result in sharing of costs by the homeowners in a problem area. A water pollution abatement district could consist of the parts of one or more towns with problems. The cost of rehabilitation or replacement of faulty systems would be financed through the district's bonding powers, and would be amortized through district taxes and user charges.

4. A training program for all personnel involved in on-site system management should be jointly sponsored by CCPEDC, DEQE and County Health. A training program for all personnnel involved in on-site system installation should be held to improve implementation of Title 5. The program should be designed for health agents, inspectors, sanitarians, engineers and septic system installers. Cooperation of the Cape Cod Community College continuing education program should be pursued. Every effort should be made to ensure attendance, such as local boards of health paying fees for all of their health agents and inspectors.

The Barnstable Health Department presently requires installers to pass an exam on local and state health regulations to qualify for a license to operate in the town. A model examination should be developed in the 208 implementation program for use by all towns in licensing installers, possibly as a part of the training course described above.

Local Actions are divided into the following two phases: actions to be taken immediately and future actions.

IMMEDIATE ACTION

1. Towns should employ a qualified health agent

The Massachusetts code for subsurface disposal, Title 5, provides specific design criteria for on-site systems. As with most technical codes, however, the enforcing agent must have knowledge of the technical basis for the code and training in field techniques to implement the code effectively. This is particularly true in the soils observation tests, where incorrect analysis of the soils can result in the installation systems in unsuitable locations.

It is recommended that all Cape Cod communities employ health agents who are registered sanitarians, and who have training and experience in soils sciences and subsurface disposal systems management. Acting health agents and their assistants who do not have special training in Title 5 enforcement should attend a training program sponsored by the county and DEQE. (See regional recommendations.)

The DEQE has attempted to provide for expert design and installation by requiring that a registered engineer or sanitarian oversee soil tests and design on-site systems. While this certainly represents an improvement over the previous lack of requirements, it is not a substitute for enforcement by a professional health agent. It cannot be assumed that an engineer's or sanitarian's stamp guarantees that the system is in compliance with Title 5, since neither sanitarians nor engineers necessarily have training in soils sciences and sewage treatment techniques. It must also be remembered that the engineer or sanitarian designing a system for a permit applicant does not represent the same interests as the town board of health.

It has been reported by professionals in the field that it is not uncommon to have to reject engineers' plans because they do not comply with the Code. A health agent lacking professional credentials could be in a difficult position to reject a professional's design under such circumstances.

A qualified health agent is particularly important in activities designed to identify and correct failing systems. A major activity of the health agent under the 208-recommended on-site system management program is the inventory and upgrading of failing on-site systems.

Title 5 provides no guidance to health boards in determining what repairs are effective or necessary in correcting system failures. In many cases limited space or soil constraints prevent the design of a new system which could comply with all of the requirements of Title 5. It is the judgment of the health agent which requirements should be waived to develop the optimum system for the site. This requires, once again, knowledge of the technical reasons for the code requirements. The matter cannot be left up to the installer if obvious conflicts of interest are to be avoided.

Determining that a system has failed is, in itself, a job for a qualified agent if he is to have success in avoiding, or winning, a court challenge. This is particularly true in the cases of marginally operational systems which may be contributing to pollution of surface waters.

It has been suggested that the smaller towns on the Cape continue to rely on the assistance of the County sanitarians for Title 5 enforcement. The County sanitarians provide technical assistance and health services to Cape Cod towns in a broad range of health fields.

The County staff are on call to all Cape Cod towns and are of considerable assistance to the smaller towns who do not have professional health agents. Under this arrangement, however, the County would be unable to make a commitment to a single town to provide the extensive work recommended in the 208 on-site system management program.

It is estimated that administration of the recommended management program would require a minimum of half-time effort of a professional agent in the smaller towns, and that the full-time health agent would need three or four assistants in larger towns. A health agent's salary should run from $13,000 to $22,000 depending upon background and experience.

Small towns who are willing to share a professional health agent may participate in a program through the Mass. Dept. of Public Health. The program pays a portion of the agent's salary over the first five years, beginning at 75% and declining to 20% on the fifth year. It is designed to encourage towns to expand their health services, especially in the areas of housing and sanitation code enforcement, and preventive medical services. The small lower Cape towns of Orleans through Truro should consider joining this program.

2. Towns should require septage haulers to report locations of systems pumped

The first step in identifying failing systems is to analyze septage pumping information. The board of health licenses septage haulers to operate in a town under Section 31A of Chapter 111. The board of health

should issue new regulations citing this authority, requiring septage haulers to report the following information. Penalty for failure would be punishable by a fine and/or suspension of license.

Name of Owner _____
Address _____
Date _____
Volume Pumped _____
Type of System _____
Repairs Effected _____
Signature of Operator _____

The simplest approach seems to be to provide (or sell) tickets to septage haulers, to be turned in at the disposal site. Cost of tickets should cover operation and maintenance of the disposal system (as provided under Section 31D of 111A) including sufficient manpower to administer and monitor the reporting system. (see section on user charges) During summer months, particularly, this may require 24-hour staffing at the disposal site. A triplicate ticket system, such as is used for oil deliveries, would provide one copy for the homeowner, one to be turned in at the disposal site, and a third mailed in a monthly report to the board of health.

This information should then be filed by the board of health under the homeowner's name or street address. When the frequency of pumping indicates that a system has failed, the board of health should send a notice to the owner and septage hauler ordering that no further service should be performed on the system without first calling the board of health for an inspection. Upon inspection of the system the health agent should order the homeowner to make the necessary repairs, under the authority of S.2.19 of Title 5.

3. Boards of health should reorganize their files to develop an inventory of on-site systems

A second step toward identifying substandard systems is to utilize information available from disposal permits. All permits issued since the revision of Article XI in 1966 should contain at least some useful information on the type and size of the system in use. Permits issued since the revision of Title 5 in 1977 should include detailed plot plans. Ideally, a file of households should be set up, either by homeowner's name or by street address. All systems not in this file should be assumed to be some form of cesspools. The files should be used for reference where failures are reported, and should gradually be expanded to include a complete inventory of subsurface disposal systems in use. The Town of Lakeville, Ma. utilized CETA employees to perform this filing inventory.

4. Towns should conduct a sanitary survey in problem areas.

It is recommended that the towns conduct a sanitary survey in all Category 1 and Category 2 problem areas delineated by the 208 program. Additional problem areas may be selected on the basis of ground and surface water quality monitoring results. A sanitary survey can be

performed by the health agent or an engineering consultant. In such a survey, an inventory of all systems, including their type, size, age and condition is made on the basis of disposal permits, homeowner interviews, "windshield surveys" and field inspections of systems where indicators of potential failures are evident. Dye tests are performed where illegal discharges to storm drains or surface waters are suspected. An evaluation of soil and water table conditions is made to determine whether on site systems can be made to function properly or a sewered solution is necessary. While the sanitary survey can be costly and time-consuming, it is the only means of evaluating the feasibility of rehabilitating systems and determining sewer needs. Unless such a survey is made a large category of marginally-operating systems which are causing potential public health problems or polluting ground and surface waters would go undetected. Sanitary surveys are 75% fundable under Step 1 facilities planning projects.

5. Towns should require failing substandard systems to be upgraded to septic tank systems

The board of health has the authority to require the abatement of nuisances, "sources of filth and causes of sickness...which may in its opinion be injurious to the public health," under Chapter 111, S. 122. The board of health's authority to order a homeowner to upgrade a failed system is stated in Section 2.19 of Title 5 which provides that "the owner...shall keep sewers and disposal systems in proper operating condition and shall have such works cleaned or repaired at such time as ordered by the board of health." Boards of health are encouraged to invoke their authority against substandard systems which have failed more than once, as suggested under "require septage haulers to report failing systems serviced." Systems which can be shown through dye tests to be discharging to a surface water body should also be required to be upgraded.

A number of comments have raised concern over the strength of the board's authority to require upgrading. More work needs to be done to determine the limits of the authority carried by the health regulations and the general laws cited, and to determine needs for revised legislation. Technical assistance in this field will be provided to the towns by CCPEDC (see regional recommendations below). The establishment of legally defensible criteria for determining that a system has failed should be part of this implementation project. (see regional and state actions) Cost of upgrading and replacing on-site systems can range from $750 to several thousand dollars. See draft Chapter 4 for detailed cost discussions.

6. Boards of health should not allow rehabilitation or replacement of cesspools, and should not allow the use of chemical scouring agents for rehabilitation of cesspools or leach pits.

In issuing permits for repairs, boards of health should require mechanical repairs and replacement of systems in conformance with Title 5. There should be no variance to this policy.

7. Towns should require upgrading of substandard systems prior to issuance of building permits for expansion of living space or conversion of seasonal dwellings

The board of health should adopt a special health regulation requiring that an applicant for a building permit demonstrate that septic system capacity conforming to Title 5 is available to serve the new living area or new year-round use. This regulation would reinforce the provisions of Section 2.7 of Title 5.

A Lakeville, Ma. health regulation making these requirements was recently overturned by the District Court. The decision was not based on the merits of the specific Lakeville regulation, however, and the Mass. Attorney General has joined in an appeal. Progress of this suit should be closely watched, since denial of a building permit or occupancy permit is the most effective mechanism available for enforcement of sanitary regulations.

Special zoning districts should be considered to control conversion of high-density for areas to year-round residential uses (see "Land Use Controls" section).

8. Towns should assist low income residents in financing upgrading of systems

It has been reported that in many cases failures of substandard systems coincide with low income areas. Enforcement of health regulations in those areas could place an unreasonable burden on the homeowners or tenants. There are, however, several sources of funds which can be used for these purposes. These include federal grants and loan programs, the betterment act and formation of water pollution abatement districts. Towns should take an active role in identifying needs and applying for such funds. Assistance in further exploring these funding routes should be provided by CCPEDC (see regional recommendations).

9. Towns should educate homeowners on proper operation and maintenance of septic tank systems

As part of the on-site system management program, the board of health should distribute to all homeowners information on the proper use and maintenance of on-site waste disposal systems. This could be accomplished by mailing an informational pamphlet to all taxpayers, followed by general distribution by the board of health, septage haulers, real estate agencies and conservation organizations, to new homeowners and visitors.

A useful pamphlet has been developed by the Southeast Regional Planning and Economic Development District. A pamphlet directed to particular problems on Cape Cod should be developed as part of the ongoing 208 program (see regional recommendations). A brief sample of the content of such a brochure is as shown on the next page.

DO'S AND DON'TS OF SEPTIC SYSTEM USE

A septic tank system is a biological treatment system which retains solids and returns liquid wastes to the ground through a percolation system. In the septic tank, microbial action breaks down the solids and reduces their volume. The remaining sludge, or septage, must be removed from the tank periodically. If this is not done, solids will overflow into the percolation system and clog it. The system then will back up into the house, or flow out onto the ground, necessitating costly repairs or replacement of the system.

The helpful bacteria in the septic tank must not be upset by the addition of chemicals into the system, nor should it be overloaded with garbage and paper wastes. The following DO's and DON'TS should be observed to prevent failure of your septic tank system.

DO

--Have a licensed septage hauler inspect your system regularly and pump it out when the septic tank is more than 1/3 full of sludge (every 2 to 4 years)

--Fix leaky faucets and toilets promptly

--Avoid extreme peak flows by spacing out laundry loads, bathing and dishwashing

--Use water conservation devices (toilet tank modifications, faucet aerators, water conservation showerheads)

--Investigate promptly indications of pot ential failure. These include:

*Grass especially green, or snow melted over leach facility

*Standing water in vicinity of leach facility

*Black or reddish mud around leach area

*Slow flushing toilets

*Sewage odor in yard

DON'T

--Don't use caustic drain chemicals, spot removers, or large amounts of laundry bleach

--Don't dispose of grease, oils, paints, pesticides down the drain

--Don't use a garbage grinder

--Don't dispose of paper diapers or other sanitary products

--Don't put chemicals into the cesspool or leach pit for the purpose of maintaining or de-clogging it

--Don't put large shrubs or trees, buildings, driveways or parking lots on top of waste lines or septic tank systems

10. Boards of health should adopt subsurface disposal regulations more stringent than Title 5.

Because of the very porous nature of much of the soil on Cape Cod, boards of health are encouraged to pass special regulations requiring that:

--leach facilities shall be set back 100' from surface waters, or the maximum distance possible on lots with inadequate depth, (but in no case less than 50').

--leach facilities shall be set back the maximum feasible distance from private wells but in no case less than 100'.

The towns of Chatham and Barnstable, which presently have septage treatment facilities should adopt health regulations requiring that:

--septic tanks shall be cleaned at intervals of once every (two, three) years for year-round homes and once every four years for seasonal homes.

Since percolation tests are enfluenced by seasonal changes in precipitation and related soil saturation, boards of health are encouraged to issue a regulation providing that:

--where in the judgement of the agent of the board of health, soils contain significant amounts of clay or fines, the agent may require an applicant for a subsurface disposal permit to repeat percolation tests between the months of November--June prior to issuance of the permit.

LOCAL ACTION: FUTURE PHASES

1. A mandatory septic system maintenance program should be initiated

Maintenance pumping, if generally practiced, could create sizeable septage flows. It is essential that towns regulate maintenance pumping in some way so that excessive seasonal peak flows can be avoided. When construction of septage treatment facilities is planned, towns should select a pumping schedule to serve the needs of its own population, using the following general criteria:

YEAR-ROUND HOUSES

Systems of less than 1000 gal. septic tank capacity with no garbage grinder; or systems less than 1500 gal, with a garbage grinder should be pumped every two years.

OTHER YEAR-ROUND USES

Should be pumped every three years

SEASONAL USES

Should be pumped every four years

Various pumping management programs are explored in the draft plan (see pp. 4-90 to 4-92). The ongoing 208 planning personnel should assist towns in selecting and setting up the administrative program, including drafting model health regulations, contracts, etc.

2. Towns should adopt health regulations more stringent than Title 5

Various proposals for controlling the timing of soils and water table tests have been explored for other 208 planning areas. DEQE has contracted with USGS to develop a formula for adjusting water table elevations made any time of year to the seasonal high. Towns should begin to employ this method as soon as it is available.

Model health regulations specifically designed to implement the 208 recommendations will be drafted on the basis of experience in the field during the demonstration on-site system management project.

Environmental Impacts: Wastewater Management

(See draft plan for explanation of environmental assessment process)

RECOMMENDATIONS	SEWER CONSTRUCTION PROJECTS					NON-SEWERED AREAS				ON-SITE SYSTEM MANAGEMENT				
	Construct sewers in proposed service areas	Limit sewering to existing problem	Land disposal preferred	Spray-irrigation preferred	Advanced treatment required near/upgradient supply wells	Regionalize septage facility	No new interim lagoons/ require treatment	Composting preferred treatment	Decentralized alternatives in major Category 2's	Require/hire qualified health agents	Require upgrading of failures	Educate homeowners on septic system use	Require regular pumping	Adopt health regulations more stringent than Title 5
ENVIRONMENTAL IMPACTS														
Biology/Ecology	B	C	B	A	A	B	B	A	B	C	C	B	B	B
Land														
-Environmentally sensitive areas	B	B	B	C	C	B	B	A	B	C	B	B	B	B
-Historical, archaelogical sites	C	C	C	C	C	C	C	C	C	C	C	C	C	C
-Open space, wetlands, forest	C	C	C	B	C	B	B	B	C	C	C	C	C	C
-Soil erosion	D	C	B	B	C	B	B	A	C	C	C	C	C	C
Water Quality	B	C	A	B	C	C	C	C	B	B	A	B	B	B
-Coastal														
-Ground & Surface	B	C	B	B	A	B	A	A	B	B	B	B	B	B
Water Quantity	D	C	B	B	B	C	C	C	B	C	B	B	B	B
-Groundwater balance														
Air Quality	B	C	C	B	C	B	A	A	B	B	B	B	B	B
Energy conservation	D	B	B	C	D	B	C	B	B	B	B	B	B	B
ECONOMIC IMPACTS														
Increase in job opportunities	B	C	C	B	B	C	B	B	C	B	B	C	B	C
Reduced unemployment	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Economic diversification	B	C	C	B	C	C	C	C	C	C	C	C	C	C
Property value increase	B	C	C	B	B	B	B	B	B	C	B	B	B	C
-Developed property														
-Undeveloped land	C	C	C	C	B	B	B	B	C	C	C	C	C	D
Minimized service costs	D	B	C	D	D	B	D	B	B	B	B	B	B	B
Minimized public share of costs	D	B	C	D	D	B	C	B	B	C	B	B	B	B

For impacts that are physically

A Very beneficial impact relative to baseline

D Adverse

ENVIRONMENTAL IMPACTS (cont.)

RECOMMENDATIONS	SEWER CONSTRUCTION PROJECTS					NON-SEWERED AREAS					ON-SITE SYSTEM MANAGEMENT				
	Construct sewers in proposed service areas	Limit sewering to existing problem	Land disposal preferred	spray-irrigation preferred	Advanced treatment required near/upgradient supply wells	Regionalize septage facility	No new interim lagoons/ require treatment	Composting preferred treatment	Decentralized alternatives in major Category 2's	Require/hire qualified health agents	Require upgrading of failures	Educate homeowners on spetic system use	Require regular pumping	Adopt health regulations more stringent than Title 5
SOCIAL IMPACTS														
Land Use														
-Growth rate	2	1	0	0	0	0	0	0	1	0	0	0	0	0
-Saturation population	1	1	0	0	0	0	0	0	1	0	1	0	0	1
-Focusing	3	1	0	0	0	0	0	0	1	0	1	0	0	1
Housing availability	1	1	0	0	0	0	0	0	1	0	0	0	0	0
Community character	2	1	1	1	0	1	1	1	1	0	1	0	0	1
Restrictions on property use	0	1	0	0	1	0	0	0	1	0	1	0	1	1
Local autonomy	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Transportation	0	0	0	0	0	2	0	0	0	0	0	0	0	0
OTHER CONSIDERATIONS														
Political/Institutional	+	+	+	+	-	-	+	+	+	+	+	+	-	+
-Institutional feasibility														
-Public acceptability	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-Public accountability	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-Efficiency/economy of scale	++	+	+	+	-	++	+	+	+	+	+	+	+	+
Technical														
-Availability of technology	++	+	+	+	+	+	+	+	+	+	+	+	+	+
-Ease of implementation	-	+	-	-	--	-	-	+	-	+	-	++	--	-
-Effectiveness	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Consistency														
-CZM Plan consistency	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-OSP Policies consistency	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-SENE Plan consistency	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Social impacts are evaluated by magnitude of change:

0 No Impact
. Slight Impact
2 Moderate
3 Major Impact

Other considerations are evaluated as either positive or negative:

++ Very Positive
+ Positive
- Negative
-- Very Negative

Land Use Controls

Human use of the land -- for homes, businesses, industries, agricultural and recreational purposes -- creates water quality problems. The control of these human sources of pollution can be accomplished through a number of different approaches. Many of these control mechanisms are discussed and recommended in other sections of this final plan. Here, the use of direct land use and growth control measures is suggested.

As discussed in the draft plan, the major pollution sources of concern on Cape Cod are non-point sources of pollution. Population growth generally increases the intensity of pollution and proliferates the pollution sources. The 208 planning program has projected population growth to 1995 (see Table 5.1 of the draft plan). This population growth can also be projected to take place in a scattered pattern and will increasingly affect inland areas of the Cape where most public wells are located. Additional growth around ponds and along the shore can also be expected. The increase of non-point sources of pollution due to population growth is the major water quality problem on Cape Cod.

To a certain extent non-point sources can be controlled using abatement measures discussed in the sections,"Non-Point Source Controls" and "Wastewater Management." Perhaps the most effective control is through preventive land use measures. Where certain human uses will be particularly harmful to water resources, these activities are either eliminated or minimized.

Such an approach involves managing the pattern or location of population growth to avoid areas critical to water resources. Population growth rate can also be managed to better pace the public service needs of the growing population.

Two specific and often related land use concerns are also addressed in this section, managing seasonal areas which can often be present or potential wastewater management problem areas and controlling the impacts of non-point source pollution on ponds

Protecting Critical Water Resources

Land use measures can be used to protect water quality in three main ways, 1) by actually preventing the harmful land use from taking place, 2) by allowing the land use to take place in an area that will have a minimal effect on critical water resources, or 3) by modifying the land use to minimize its impact on water resources. All three of these approaches are integrated, to some degree, in the 208 land use recommendations.

The main thrust of the recommendations rests on controlling major non-point source impacts on critical water resources. Certain areas have been selected by the 208 program as being of special concern to water quality and are categorized as "Water Resource Protection Areas." These areas include:

1. Recharge areas of present and future municipal well sites
2. Areas relying on private wells for water supply
3. Areas around and upgradient of great ponds
4. Areas upgradient of coastal embayments

Additional areas of concern are flood plains and wetlands. However, it is believed that adequate protections for these areas are available under the Federal Flood Insurance Program, the state Wetlands Act, the Coastal and Inland Wetlands Restrictions Programs (the use of the Inland Restrictions Program for pond protection is suggested in the recommendations) and through local bylaw adoption. Towns may also choose to adopt these recommendations for all ponds, not just those classified as great ponds (10 acres or more).

The "Water Resource Protection Area" recommendations are aimed at eliminating major non-point sources (landfills, junkyards, etc.), reducing the number of non-point sources (lowering density of use) and modifying harmful land uses (limiting impervious areas, maintaining vegetative buffers, etc.) in the vicinity of critical water resources. Through these measures it is expected that the impacts of non-point sources in these areas will be minimized and the quality and quantity of recharge will be maintained at a reasonable level.

The first step in protecting critical water resource areas is to define the boundaries of the area to be protected. While the 208 draft plan provides preliminary guidelines for each category of critical water resource, this information must be refined to actually delineate protection areas.

EPA has provided funds to CCPEDC to assist the towns in defining the areas that should be protected by Watershed Protection Districts during the coming year. As part of this program, CCPEDC staff will work specifically with the planning board, water commission and conservation commission. The water commissioners will provide information on present well capacities and pumping practices. They will also be asked to indicate all future water supply development plans including any areas they hope to develop as future well sites. With the assistance of the planning board and conservation commission, the present land uses and zoning

in these areas will be examined. It is extremely helpful if the town has an accurate and up-to-date land use map. In cases where such a map is not available a detailed inventory of land uses within the area must be conducted. The inventory is conducted to assess the need for zoning changes to modify the density in certain areas to meet the overall recommended density for the entire area.

The actual definition of the Watershed Protection District boundaries should be guided by the criteria presented in the 208 plan and by the 208 formula for delineating the recharge areas of public wells. Recent experience in assisting towns in this task indicates that it is most important that the delineation of these protection areas consider certain natural and manmade boundaries. The accommodation of existing conditions while adhering to the major criteria for these areas can best be determined with the assistance of the 208 planning staff.

Zoning Changes vs. Land Acquisition

In certain towns the possibility of meeting the overall density recommendations for the Watershed Protection Districts can only be accomplished through land acquisition. Development around the wells, in such areas, is particularly dense and many of the remaining areas have been subdivided for development.

In other towns zoning changes may help to achieve the overall density but acquisition would also be helpful to insuring the overall density recommendation is followed. Further, some towns may view land acquisition as a more equitable approach than a major zoning change that may adversely affect a small group of landowners.

In all towns, land acquisition to protect watershed areas should be a priority. Conservation commissions should include the acquisition of watershed areas in their open space and recreation plans. By allowing passive recreation in these areas (walking, bicycling, canoeing, etc.) the towns will maximize the benefits of public ownership and improve the possibility of obtaining BOR or state "Self-Help" funds. While land acquisition of watershed areas may seem costly in the short-term, the protection of public wells will avoid deterioration of water quality in the well that may one day require treatment or relocating the wellfield at even greater cost. Watershed protection as part of an overall open space and recreation plan for the town also provides a valuable means of preserving community character.

Recommended Controls

A model Watershed Protection District Bylaw was included in the draft plan and is currently being revised by the 208 planning staff. It is recommended that the towns work directly with the 208 staff to delineate watershed protection areas and to adapt the revised model to their town needs. Model bylaws for the other recommended protection areas will also be developed in the continuing program. However, the protection of present and future public wells is considered to be a priority for town action.

Watershed Protection Areas

Criteria

1. As a minimum, the size of the public water supply protection area should be equal to that required to recharge the estimated volume of water needed to meet the water supply needs of the 1980 population.

2. Designation of as much additional area as possible within the public water supply protection areas for future local and regional water needs is strongly encouraged. In selecting areas for future water supply protection towns should avoid areas downgradient of any existing land use with known adverse impacts on water quality, such as dumps, road salt, oil and gasoline storage facilities, sewage treatment facilities, sewage treatment facilities with on-site disposal of secondary treated effluent, or on-site septic systems at densities greater than one dwelling unit per 20,000 sq. ft.

3. Designated areas should be located around and upgradient of present and future well fields. See Appendix F in draft plan for discussion of the formula for preliminary definition of watershed areas.

Recommended Controls

1. Single Family Residential: Regulation of on-site sewage disposal systems in a public water supply protection area should be based on the estimated annual nitrogen loading. The loading should be regulated so that nitrate levels in the groundwater will remain well below 10 ppm Nitrate - nitrogen, preferably not higher than 5 ppm.

Assuming present on-site disposal practices and climatic conditions, the annual nitrogen load should not exceed 16 lb/40,000 sq. ft./year. Based on an average nitrogen production rate of 7 lbs/person/year and an average year-round occupancy of 3 persons/dwelling, the regulation of development by nitrogen loading would result in an overall density within the entire public water supply area of one single-family dwelling unit per 40,000 - 60,000 sq. ft. (see Ch. 3 of draft plan for loading formula).

Due to the integrating nature of large municipal wells, some sections of higher density can be compensated for by including in the protection area,sections of lower density. Thus, where previous development or new subdivisions built under grandfather clauses result in higher densities, efforts should be made to compensate through preserving areas of lower density, and limiting new development by acquiring conservation areas.

Where little development or previous subdivision of land has occurred, a zoning change to 40,000 sq. ft. minimum lot size may be adequate. Where significant higher density exists in some areas, the town should consider 60,000 or 80,000 sq. ft. minimum lot sizes.

2. Multi-family Residential and Cluster Development: Regulation of multi-family residential and cluster development uses will be based on the same assumptions made in regulating single-family residential uses.

a) Cluster development of single-family residential units should be permitted, provided the overall density of the watershed protection area is not exceeded.

b) Open space should be retained with natural cover and should be distributed in such a way as to afford a buffer between the on-site systems and any surface water body or municipal wells.

c) An exception to the above regulations could be permitted if an approved tertiary treatment method is used. Approval shall be given to tertiary treatment methods which return water meeting drinking water quality standards to the groundwater.

3. All other permitted uses should have a total nitrate loading of not more than 16 lb/40,000 sq. ft./yr.

4. No variance to Title 5 or local health regulations should be permitted within this area without a public hearing at which the applicant bears the burden of proving that a variance will not result in any deterioration in groundwater quality.

5. All runoff from impervious surfaces should be recharged on the site. Runoff should be diverted to the maximum length of perimeter feasible, with runoff directed toward areas covered with vegetation for surface infiltration. Use of dry wells should be discouraged and permitted only when surface infiltration is clearly inadequate.

6. To reduce runoff generation and contamination, the area covered by impervious materials (house, driveway, etc.) should not exceed 10 percent of the lot. It is also recommended that a minimum of 30 percent of the lot should be retained in natural vegetation.

7. Prohibited uses in a watershed protection area should include:

a) landfills and junk yards;

b) sewage treatment facilities with on-site disposal of secondary-treated effluent;

c) car washes and laundromats;

d) major transport terminals (bus, air);

e) subsurface oil and gasoline storage in non-fiberglass containers and chemical storage in corrodable containers;

f) commercial or industrial uses which produce potentially hazardous waste, and;

g) uses which require large scale use of chemical pesticides, herbicides, fertilizers and road salts.

8. Boards of health should review all plans and applications for compliance with watershed protection area regulations.

Private Well Protection Areas

Criteria

This district would include all areas of the town not served by public water supply. A developer could be exempted from these requirements only by providing a public water supply.

Recommended Controls

1. All controls recommended for protection of watershed protection areas should be applied in these areas. Density requirements of one dwelling unit/40,000 sq. ft. is sufficient to protect private wells from potential pollution of neighboring septic systems.

2. Plans should be submitted showing all proposed and existing wells and septic systems on the parcel and abutting properties. The health agent should determine the placement of private wells after consideration of soil conditions, and expected direction of groundwater flow, and to obtain optimal spacing from existing or proposed on-site sewage disposal leaching areas including reserve areas. Similarly, the location of existing private wells should be taken into consideration when a new on-site sewage disposal system is being sited.

3. Plans should show all existing, proposed or abandoned dumps or landfills within 150 feet of the property line. No well should be located within 150 feet of any such dump or landfill. No new dump should be located within 150 feet of a private well unless the town agrees to provide public water, should such private well be contaminated.

4. Cluster development should be encouraged only when other requirements are met.

5. The board of health should review all plans and applications to insure compliance with private well protection area controls.

Great Pond Protection Areas

Criteria

Areas around all great ponds should be designated as great pond protection areas. At a minimum, a zone extending 300 feet from the pond edge should be protected. Due to the potential adverse impacts of septic seepage, an additional zone of up to 1,000 feet should be protected upgradient of each great pond.

Recommended Regulations

1. All regulations recommended for watershed protection areas should be applied in these areas. Density requirements of one dwelling unit/ 40,000 sq. ft. would be adequate for these areas.

2. No part of a proposed septic system, except the septic tank, but including the reserve area, should be within 100 feet of a great pond.

3. The lowest point of any leaching system installed within a great pond protection area should be at least four feet above the mean high groundwater level.

4. A buffer zone of at least 25 feet of natural vegetative cover should be maintained along the water's edge.

5. The conservation commission should review all plans and applications for compliance with the great pond protection area regulations.

Coastal Embayment Protection Areas

Criteria

All areas within 1,000 feet of mean high water of a tidal embayment or harbor having restricted water flow should be designated as a coastal embayment protection area.

Recommended Controls

1. The same as for great ponds, with all distances taken from mean high water.

Growth Management

Managing growth to protect water quality primarily involves managing the pattern of growth to avoid areas critical to water resources. Implementing the density recommendations for the Water Resource Protection areas should help to maintain an acceptable density of development in these areas. According to the population projections developed in the 208 program, projected growth to 1995 will not significantly increase the need for sewers. The water quality impacts of this projected growth should also be minimal if the towns adopt the 208 recommended land use controls. However, the rate of growth can have a significant impact on the town's ability to keep up with

the service demands of the growing population.

The need to expand a water supply system (installing new wells, increasing the service area) or sewer collection systems, as well as other town services such as schools, is determined by the rate of population growth. If that growth takes place rapidly and unexpectedly, the town may be faced with sudden expansion needs that will severely burden the entire town. Managing the rate of growth can avoid these problems by allowing the town to meet the service needs of the population through a planned schedule of service expansion.

It must be emphasized that growth rate management should be one portion of an overall town growth strategy. The growth rate chosen should be sufficient to accommodate the growth rate of recent years. The planning board should examine the town's master plan to evaluate where they want to encourage growth (sewered areas, areas with town water) and where they want growth to be limited (water resource protection areas). Towns should modify their zoning by-laws to reflect this growth strategy by modifying densities, by allowing PUD and cluster development in appropriate areas, and by applying special controls over uses in protection areas through overlay districts.

While growth rate management is not directly related to protecting water quality, it can be a useful tool in managing all of the town's resources. A model rate regulation by-law, adopted by the town of Bourne, is included in Appendix B (revised version of model presented in draft plan).

Managing Seasonal Areas

While the projected population growth over the 208 planning period is not expected to significantly increase sewer service area needs, certain areas may be susceptible to the development of serious wastewater management problems caused by growth. Of particular concern are areas that are densely populated and highly seasonal where wastewater management problems already exist. While these areas may not experience additional housing development since saturation of these areas is common, growth within the areas will take place through the conversion of the seasonal dwellings to year-round houses.

The conversion of a seasonal dwelling to year-round living is a common cause of on-site system failure. A cesspool that may function adequately for summer use can fail within the first year of constant use. To complicate the problem, many seasonal dwellings are located on small lots making rehabilitation of the failing system according to all Title 5 regulations difficult, if not impossible. Further, many such densely populated neighborhoods are located in areas of poor soils or high water table. And finally, these seasonal neighborhoods are often located near water amenities, on ponds or near the shore. The impact of the density and failing systems of these areas is of serious concern to water quality, both the quality of the nearby water body and also groundwater quality in the area.

The Mass. Department of Community Affairs conducted a study of seasonal neighborhoods in Lakeville in 1977. One of the results of this study was the recommendation that the town improve its control of seasonal areas through the zoning bylaw. The town can create an overlay district that would control conversion of a seasonal to a year-round residence and the enlargement or alteration of both conforming and non-conforming year-round and seasonal residences (DCA, 1977). The creation of such a special district focuses attention on the conversion problem in the area and allows the town to apply controls to the area as a whole.

Creating such an overlay district for seasonal areas is also recommended by the 208 plan and it is suggested that these areas be called "Seasonal Residential Districts." The first step in creating these districts is to establish their boundaries based on existing physical characteristics of the land and present lotting arrangements.

For those towns that do not presently distinguish between seasonal and year-round housing units in their zoning by-laws, definitions should be included that would clarify the distinction between these two types of residential use. The DCA study suggests that the Harvard, Mass. zoning by-law that controls seasonal conversions can be adopted by other towns with these problem areas. The Harvard by-law is as follows:

> "CONVERSION OF SEASONAL RESIDENCE. Conversion of a lawful existing seasonal residence for use as a permitted year-round residence and for which the lot is not conforming to the lot size standards of the By-Law is subject to the grant of a special permit by the Board of Appeals. Any application for such permit shall be referred to the Board of Health and to the Planning Board for reports thereon.
>
> A special permit shall be granted only if:
>
> a. the Minimum Standards of Fitness for Human Habitation and Minimum Requirements for the Disposal of Sanitary Sewage in Unsewered Areas, (Article 2 of the State Sanitary Code and Title V of the State Environmental Code respectively), sewage disposal setback requirements of this By-Law, and the rules and regulations of the Board of Health are met; and
>
> b. the Board of Appeals finds that similar such conversion of all seasonal residences in the general area having lots similar (or less limited) in lot size and land and soil type characteristics would not result in substantial danger of contamination of the ground water supply or of any pond or stream. In making such finding, the Board shall consider the ability of the soil to absorb expected quantities of sewage disposal effluent, the degree of filtration of effluent before entering this ground water supply, and other characteristics of the land and soil types."

Pond Management

Pond eutrophication is a serious water quality problem affecting a number of Cape ponds as discussed in the draft plan. There are a number of corrective and preventive eutrophication control techniques. The most effective long-term control technique is managing land uses around and upgradient of the pond. Such controls can be accomplished by towns adopting overlay districts that would control the uses in these areas as recommended for the Great Pond Protection Areas. Zoning changes that would allow a density of one dwelling unit per acre in these areas are also recommended in this plan.

In addition, erosion and sedimentation controls should be strengthened through changes in the subdivision regulations, and in requiring erosion control plans. Storm drains should not be allowed to discharge to ponds as recommended in the "Storm Water Runoff" section. Conservation commissions should investigate drains that are suspected pollution sources. If the storm drain is causing a pollution problem, the conservation commission should order the removal of the storm drain with their authority under the Wetlands Protection Act.

Once a pond has eutrophication problems there are certain in-lake restoration techniques that can be utilized. Many of these techniques, however, are costly and, to be effective on a long term basis, should be combined with land use controls. It is particularly important, as well, that a thorough ecological analysis of the pond be conducted, including a nutrient balance and benthic studies, prior to selecting a control technique. Pond studies can also be costly.

Funding assistance to conduct a pond study is limited. DWPC conducts a limited number of intensive pond studies as part of the Lake Classification Program each year. CCPEDC assisted the town of Mashpee in obtaining such a study for John's Pond in the coming year. In general, intensive pond studies must be carried out with town funds. It is the recommendation of the 208 plan that all pond studies conducted by towns be coordinated with the 208 program and that they include all of the water quality tests utilized in the State Lakes Classification Program and those required by the Federal Lake Restoration Program.

There are a number of state and federal programs that provide funding or assistance to towns in implementing a pond management program. The Federal Lake Restoration Program authorized under Section 314 of the Clean Waters Act will provide 50% funding to help develop or demonstrate new or improved methods for the prevention, removal, reduction and elimination of pollution in lakes. The program stresses restricting the input of nutrients into the pond but for particularly severe problems will also assist with in-lake treatment. To be eligible, a pond must be publicly-owned and have been classified under the State Lakes Classification Program. The applicant must demonstrate that the restoration project will provide long-term improvement and benefits for the general public.

Pond management can also be addressed through a comprehensive town-wide 201 facilities plan. Water quality problems of ponds in the town should be examined in a 201 study to determine what structural or non-structural solutions could be implemented to correct the problem. Under the 201 program, funds for structural solutions such as sewering or upgrading septic systems around the pond may be available in the construction phases of the 201 plan. Section 314 funds specifically are not available for examining or implementing control measures that can be accomplished with 201 funds.

The state also provides assistance for lake management, specifically in-lake management, through the Aquatic Nuisance Control Program conducted by DEQE under Ch. 722 of the Acts of 1969. DEQE directly carries out some control projects and acts as a licensing and permitting agency for work supported by local governments and private groups. At present, aquatic vegetation control efforts by DEQE only involve the application of herbicides. DEQE is also examining other aquatic nuisance control techniques for possible inclusion in the state program.

There are two major problems in implementing comprehensive pond management in Massachusetts, one is the lack of funds for studying pond problems and implementing control techniques, the other is the lack of coordination between state and federal programs that could be used for these purposes. There is little guidance available for towns faced with a pond problem, on how to approach the problem, what types of water quality studies may be necessary, and what management techniques would be most appropriate to solve the problem. Towns are left with the prospect of spending considerable funds on private consulting firms in highly technical areas without any assurance that the sampling approach or control technique recommended is adequate to meet the problem.

It is the basic recommendation of the 208 program that a major effort to coordinate agencies involved in pond management be made by a single lead agency to develop approved sampling approaches and study techniques, and to set guidelines for the selection of control techniques based on the information developed through the water quality study of the pond problem. It is suggested that the Executive Office of Environmental Affairs should consider naming DWPC as the lead agency in this effort.

The following recommendations are intended to encourage the use of land use controls to improve water quality management:

FEDERAL ACTION

1. BOR funds should be provided, as a priority to acquire land, for the protection of watershed areas of public water supplies. Additional funds for this purpose should be made available.

2. EPA should consult with the 208 planning staff in evaluating applications under the Lake Restoration Program.

STATE ACTION

1. DEQE Water Supply Division should encourage water utilities to implement the 208 land use recommendations for watershed protection when they request approval for the installation of a new well or to increase the capacity of an existing well.

2. State Self-Help funds should be provided to towns to assist in acquiring land for watershed protection. The use of these funds for watershed protection should be given a high priority and DEM should consult with the 208 staff in evaluating all such requests.

3. DEM should establish performance regulations under the state Inland Wetlands Restrictions Program that will assist towns in controlling land uses affecting water quality around ponds and other inland wetlands.

4. EOEA should designate DWPC as the lead agency to examine present federal and state pond management programs and to coordinate these programs to maximize their effectiveness in implementing a comprehensive pond management program in the state. DWPC should also review all applications for pond management funds in coordination with the 208 program, as part of this function.

5. DWPC should consult with the 208 planning staff in setting priorities for testing ponds under the Lake Classification Program.

REGIONAL ACTION

1. CCPEDC should assist the towns in defining "Water Resource Protection Areas" and in adopting the recommended controls for these areas.

2. CCPEDC should assist towns concerned with pond eutrophication in developing pond studies and in selecting pond management techniques based on the results of the ecological studies.

3. CCPEDC should assist towns in obtaining funds for watershed protection.

TOWN ACTION

1. Towns should cooperate with the 208 staff in defining "Water Resource Protection Areas" and should adopt the recommended protective measures by establishing overlay districts and making necessary zoning changes to modify density within these areas.

2. Towns should make land acquisition in "Water Resource Protection Areas" a high priority. Watershed areas should also be integrated into town recreation plans and passive recreational activities should be allowed. In addition, towns should consider transfer of development rights from these areas.

3. Towns should establish "Seasonal Residential Areas" in their zoning by-law and control conversions of seasonal dwelling units to year-round dwelling units through special permit.

4. Towns should conduct a thorough study of a pond which is suffering from eutrophication problems prior to taking corrective measures. Plans for such pond studies should be coordinated with the 208 program.

5. Town conservation commissions should utilize their authority under the state Wetlands Act to the full extent possible to control storm drains discharging into ponds.

6. Towns engaged in 201 Step 1 facility plans should examine pond eutrophication problems through a comprehensive study of the town.

Environmental Impacts:

Land Use Controls:

(See draft plan for explanation of environmental assessment process.)

LAND USE CONTROLS / RECOMMENDATIONS	Implement water resource protection area controls	Acquire open space in critical areas	Establish seasonal residential areas	Base eutrophication control techniques on pond study	Control stormwater runoff, erosion of sediment into ponds
ENVIRONMENTAL IMPACTS					
Biology/Ecology	B	A	B	B	B
Land					
-Environmentally sensitive areas	A	A	A	A	A
-Historical, archaelogical sites	C	C	C	C	C
-Open space, wetlands, forest	B	A	C	C	C
-Soil erosion	A	A	C	B	A
Water Quality					
-Coastal	A	A	B	C	C
-Ground & Surface	A	A	B	A	A
Water Quantity					
-Groundwater balance	B	B	C	B	C
Air Quality	C	C	C	C	C
Energy conservation	C	C	C	C	C
ECONOMIC IMPACTS					
Increase in job opportunities	C	C	C	C	C
Reduced unemployment	C	C	C	C	C
Economic diversification	C	C	C	C	C
Property value increase					
-Developed property	B	B	C	B	B
-Undeveloped land	D	D	C	C	C
Minimized service costs	B	B	C	C	C
Minimized public share of costs	B	B	B	B	B

For impacts that are physically or qualitatively measurable:

A Very beneficial impact relative to baseline
B Beneficial
C No difference from baseline
D Adverse
E Very Adverse

ENVIRONMENTAL IMPACTS:
LAND USE CONTROLS (cont.)

RECOMMENDATIONS / LAND USE CONTROLS	Implement water resource protection area controls	Acquire open space in critical areas	Establish seasonal residential areas	Base eutrophication control techniques on pond study	Control stormwater runoff, erosion of sediment into ponds
SOCIAL IMPACTS					
Land Use					
-Growth rate	1	1	1	0	0
-Saturation population	1	1	1	0	0
-Focusing	2	2	1	0	0
Housing availability	1	1	1	0	0
Community character	2	2	1	1	1
Restrictions on property use	1	1	2	0	1
Local autonomy	0	0	0	0	0
Transportation	1	0	0	0	0
OTHER CONSIDERATIONS					
Political/Institutional					
-Institutional feasibility	+	+	+	+	+
-Public acceptability	+	+	+	+	+
-Public accountability	+	+	+	+	+
-Efficiency/economy of scale	+	+	+	+	+
Technical					
-Availability of technology	+	+	+	+	+
-Ease of implementation	+	+	+	+	+
-Effectiveness	+	+	+	+	+
Consistency					
-CZM Plan consistency	+	+	+	+	+
-OSP Policies consistency	+	+	+	+	+
-SENE Plan consistency	+	+	+	+	+

Social impacts are evaluated by magnitude of change:

Other considerations are evaluated as either positive or negative:

Water Supply Management

The greatest need for regional planning on Cape Cod is in water supply management. The fifteen towns share a groundwater aquifer locally recharged by precipitation as their sole source of water supply. While the volume of groundwater available for water supply is generally abundant, planning efforts must be directed at maintaining drinking water quality.

To ensure water quality, towns must protect the land areas which provide recharge to their water supply wells. Since the recharge area for a municipal well is quite large, and since groundwater flows readily across town boundaries, polluting land uses in one town may affect a neighboring town's water supply. Even if a town were to provide for the protection of its own water supply wells, the state legislature could allocate some of its water resources to a neighboring town which has over-developed or polluted its own water resources.

The need for regional water supply planning was illustrated by recent developments on the outer Cape. Provincetown obtains its water from Truro because its own groundwater is of naturally very poor quality. Permission to obtain water from a limited area of Truro was given to Provincetown by a special act of the Massachusetts legislature. The present water system is inadequate, and Provincetown has for several years been looking for a new 1 MGD well site.

Provincetown's second wellfield was shut down in 1977 because of a gasoline spill at a nearby service station, creating an immediate need for an emergency supply. A large portion of the area in which Provincetown is authorized to place wells is now within National Park boundaries, however, and national policies are generally against removal of water resources from a National Park.

The emergency was resolved by the installation of two temporary wellfields, one in the National Park under an emergency permit, and one in North Truro Air Force Base. The long-term water shortage remains unresolved, however, as the condition of the National Park permit was that the system would be removed when the permit expires. There is also growing resistance among Truro citizens to the development of permanent wellfields in Truro. Concern over possible adverse impacts on private wells is the primary basis for this resistance, and the question has often been raised whether Provincetown should have the right to grow beyond the capacity of its available water supply at Truro's expense.

While the Provincetown case is extreme, several towns on the Cape may have to face the question of whether they can protect adequate water supply recharge areas within their towns to supply their projected population, or whether water treatment, inter-town water transfers or growth control may be needed to ensure an adequate water supply. A comprehensive water supply planning program is needed to answer these questions. Two preliminary steps were conducted during the 208 planning effort. "Recharge area needs" were projected and "potential water supply development areas" were identified.

Recharge Area Needs

During the 208 planning program a formula was developed for estimating the amount of land area a town would need to protect to maintain water quality in a supply well. As described in draft Chapter 5, the groundwater is recharged by precipitation percolating through the land surface. It has been estimated that 16" of the total annual precipitation on Cape Cod recharges the water table. Using this figure, the amount of land area contributing recharge to a well can be calculated on the basis of the pumping rate.

The formula was used to estimate the amount of land area that will be contributing to town water supply wells in 1995 if the entire population is served with public water. Summer 1995 population projections and an assumed per capita water use of 100 gal/day were used to draw circular "recharge area needs" for each town. (See Map 5.5 Recharge Area Needs) The circles may be interpreted as indicating the minimum amount of land area to be placed under protective controls to guarantee the quality of water for 1995 supplies. It must be understood that this formula is based on a number of simplifying assumptions, however, and that the intention of the map is to indicate the gross relationships of the recharge areas to the total land area of the towns.

It must also be understood that the map is not intended to indicate water quantity limitations. With the exception of Provincetown and Truro, there should be no question that the needed volume of groundwater will be available for water supply. As long as there are no major withdrawals for consumptive use (in which the used water is not returned to the ground) there are no foreseeable water quantity problems other than Provincetown's. Localized pond water level lowering and saltwater intrusion are possible, however, and are discussed in the draft plan (Environmental Assessment, Chapter 4).

Potential Water Supply Development Areas

To determine whether towns can meet the recharge area needs within their town boundaries, existing land uses affecting water quality were mapped on a regional scale (Map 5.2 "Water Quality Significant Land Uses"). These land areas,which are densely developed or where major pollution sources are located, are not considered to be of value for water supply protection. Additional areas downgradient, or downflow, of such polluting land uses must also be eliminated from consideration.

Land areas meeting recommended criteria for water quality protection and water supply development were identified in Map 5.6 "Potential Water Supply Development Areas." This map, too, was intended to provide a regional perspective. It is likely that towns will be able to identify additional areas within their boundaries, particularly around existing wellfields, that are suitable for water supply protection.

By comparing the Recharge Area Needs and Potential Water Supply Development Areas maps it is possible to draw some preliminary conclusions on whether towns can protect adequate water supplies for 1995 within their own borders. Using these two maps, the Cape was examined for potential regional water supply conflicts and planning needs.

Groundwater Basins

As illustrated by the Water Table Map, (Map 2.1 of the draft plan), the Cape Cod groundwater aquifer is bounded by the Cape Cod Bay, the Cape Cod Canal, the Atlantic Ocean and Nantucket Sound. This aquifer has been studied and modeled by the USGS in a four-year study to be completed in 1978. Two Bourne villages, Buzzards Bay and North Sagamore, are on the mainland side of the Canal, and draw water supplies from a different aquifer system which was investigated by USGS in 1974.

The Cape Cod aquifer is naturally divided into hydrologic sub-regions, or basins, by streams and glacial outwash valleys where the water table drops nearly to sea level. Towns within each basin can directly affect one another's water supply; however, the state legislature's power of water resource allocation makes all fifteen towns interdependent for water supply planning and management. The following discussion covers the six groundwater basins of the Cape Cod aquifer. The mainland aquifer utilized by part of Bourne will be discussed in the town section.

1. Upper Cape (Cape Cod Canal to Bass River)

The upper Cape is underlain by a large, high, water table area, 60 feet high in the center. The predominant land use feature in this region is Otis Air Force Base, which occupies 30 square miles along the Sandwich/Bourne border. Because of the large amount of land kept in natural condition by the base, it is generally believed that this area is a major water supply for the entire Cape. It is also felt that the base protects water supplies in the surrounding areas because it lies essentially at the top of the water table, and groundwater flow radiates out from the center of the base.

The value of Otis as a regional water supply requires further evaluation. Military uses are characteristically hazardous to groundwater quality. Servicing of aircraft, cleaning engines, transporting and storing gasoline and oil are major potential sources of groundwater contamination. A pipeline for jetfuel running from the Cape Cod Canal through the Sandwich section of Otis is reported to be subject to frequent and serious leaks. Several wells at the base itself have been shut down because of nitrate or phenol contamination. Water explorations in northeastern Falmouth, downgradient of the base's sand filterbed sewage disposal facility have shown elevated nitrates, and a vein of high nitrates has also been detected in undeveloped areas upgradient of the treatment plant site.

It is important that Otis be further investigated so that the idea of its being a regional watershed does not provide a false sense of security to abutting towns. It should be recognized that the fact that the water table is high at Otis, does not make it inherently more valuable than other recharge areas. Major withdrawals of groundwater cause impacts relative to the recharge rate, which is uniform throughout the Cape, rather than to the amount of water presently in storage under the area. The advantage the area does have is that it is the least vulnerable to saltwater intrusion. Any plan to export water from Otis to other parts of the Cape should be carefully analyzed for environmental impacts, using the USGS groundwater model.

The determination of Otis' value as a watershed protection area has implications beyond water supply. It has frequently been suggested that Otis is ideally suited to serve as a regional waste disposal site. Proposals have included a regional landfill or resource recovery system, regional sewage disposal for Falmouth and Otis, and a regional septage treatment plant for Bourne, Sandwich and Mashpee. If it is found that Otis presently has excellent groundwater quality, the possible environmental degradation associated with such uses might not be acceptable. If, on the other hand, it is found that some areas presently have degraded water quality, location of such uses at Otis could be most appropriate.

Comparing the Recharge Area Needs and Potential Water Supply Development Areas maps, it is evident that all the towns in this region except Yarmouth have large areas indicated as potential water supply development areas. They should have no problem meeting the needs for protected water supplies within their town borders. Barnstable has very high density development in the proximity of some wells, however, and water quality degradation has already occurred. Water treatment or replacement of these wells by wells near the groundwater divide may be necessary. Yarmouth is highly developed and has experienced some water quality degradation. It may have difficulty meeting water supply protection needs and may have to consider water treatment or connection with an adjacent town to supply untreated water at some point in the future.

2. Lower Cape (Bass River to Town Cove and Rock Harbor Creek)

A large groundwater basin is shared by the lower Cape towns of Dennis, Brewster, Harwich, Chatham and Orleans. These five towns should seriously consider coordination of water supply development. Brewster and Harwich, located at the center of the groundwater basin have the capacity to protect, or contaminate, tremendous potential water supply development areas. Orleans and Chatham, on the other hand, appear to have limited potential water supply development areas due to existing land uses and the proximity of saltwater to low water table areas. Harwich is also the only town on the Cape that is truly upgradient of another town (Chatham), with the potential for directly affecting water quality in that town.

Regional sharing of groundwater is probably already occurring in this basin. Although Dennis appears to have large water supply protection areas in its town, several of its wells are close enough to draw water from under Brewster. Chatham and Harwich are competing for water, with wells located near their common border. As with other areas, any regional water supply plan for this basin should be analyzed for environmental impacts.

3. Outer Cape (Orleans to Provincetown)

Four groundwater basins underlie the outer Cape towns, defined by Blackfish Creek, Pamet River and the Pilgrim Springs salt meadow. All of these sub-basins have very similar land use and geohydrologic features, and will be discussed together.

The lower Cape towns are narrow and are laid out in linear fashion. Groundwater flows towards each shore, and it is unlikely that water withdrawals would induce substantial longitudinal flow from one town to the next. The regional relationship of the towns is institutional: if one runs out of water it must seek water from the next town.

The freshwater lens on the lower Cape is much thinner than the upper Cape's and fresh water is underlain by saltwater. For this reason, the area is more suitable for private well use than public water supplies. Saltwater intrusion is a possible impact of any major withdrawals, and saltwater intrusion problems are already occurring in one well located in North Truro which supplies Provincetown.

The major land use feature of the outer Cape is the National Seashore Park, which was created under P.L. 87-126 for the purpose of preservation of the unique flora, fauna and physiographic setting of the area. These include the Park's groundwater-related resources: ponds, wetlands and estuaries. Since the Park maintains more than half of the land area from Eastham to Provincetown in open space and low density residential use, it essentially protects the major potential water supply recharge areas in each town.

As development outside the Park progresses, however, increased pressure will be placed on the Park to allow groundwater removal for water supply, a practice which is contrary to the Park's enabling legislation. The only authority under which the Park could provide water to neighboring towns is in P.L. 91-383, which stipulates that there must be no adverse impact on the natural environment of the Park and that an applicant for water must demonstrate that there is no feasible alternative source of water supply.

The National Park Service has formulated policies for implementing the purposes of 91-383, which include the following requirements:

--A determination must be made that the applicant has no reasonable alternative to the use of park resources or services;

--The effects of the use of the resource or service on the park's environment, administration, management and protection have been examined, and that the effects have been determined to be acceptable;

--The use of water resources will be in accordance with laws and regulations governing ownership and use of federal water and land rights;

--Reasonable charges be levied based on prevailing rates for similar services of resource use; and

--The permitted use be revokable and terminable within a specified period of time, and that no permanent property rights are conveyed to the user for any resource or water within an area of the National Park Service.

It has been a concern of the 208 program that the implementation of these policies should not lead to a narrow perspective on the environmental impacts of water supply development on the outer Cape. The water resources of the National Park cannot be thought of as being isolated from those of the remaining outer Cape lands. Development of water supply wells anywhere on the outer Cape could have adverse environmental impacts, whether the wells are located within or outside of park boundaries. Similarly, consideration of environmental impacts should not be limited to preservation of park resources alone. The 208 water quality goals call for the maintenance of natural water levels in ponds, streams and wetlands throughout the Cape. Resolution of the outer Cape water conflicts must, therefore, be based on an environmental assessment of all alternatives, including wellsites inside the park, and should lead to development of the most environmentally sound alternative for the whole region.

Water supply planning for the outer Cape basins must be given priority by the Park service, the local communities, the CCPEDC and the Massachusetts Water Resources Commission since Provincetown has an immediate need for water to serve its present population. Future water supply needs for the outer Cape area must also be assessed, giving full consideration to growth control measures and mandatory water conservation measures to prevent overdevelopment of the groundwater resources and to prevent adverse impacts on related natural resources.

Water Supply Planning

Most local water departments, water districts and private water companies carry out their own water system planning and management independent of town planning efforts. They generally prepare a supply master plan for system expansions, wellfield exploration, installation and management.

Local water supply development is regulated by the DEQE, Water Supply Division. When a water utility wants to develop a new well, it must receive approval from the DEQE. DEQE requires that the area within the 400' radius around the well be protected from human activities.

Where a town needs to install a public water supply well in another town, as Provincetown has wells in Truro, the town must obtain permission from the General Court. Once this permission has been granted, there is no further state regulation (beyond regular DEQE approval) of the number of wells or the pumping capacity of the wells installed in the neighboring town.

A water supply system may be expanded into new areas for a number of reasons including improved fire protection, reduced development costs or improved supply reliability. Water quality has not historically been a major consideration. In general, water departments or districts are responsive to requests for expansion of the system. There have been some concerns voiced during the 208 planning program, however, that private water companies have not been receptive to expansions unless all residents in the area guarantee that they will hook up to the system.

As discussed in the 208 draft plan, there are currently 17 water utilities on Cape Cod, two private water companies, nine districts and six town departments. Bourne and Barnstable are each served by four separate water utilities. With the diversity of management practices and development plans of these separate water utilities, water supply planning is difficult even within one town.

While there are some interconnections between water districts, there is little or no regional coordination of water supply planning. The Massachusetts Water Supply Policy Statement, published in May 1978, recognized this lack of long-term regional water supply planning throughout the state. The Policy Statement recommended that the Water Resources Commission initiate state level responsibilities for broad long-range planning, coordinating with regional planning agencies. To accomplish such regional and local water supply planning, the policy statement calls for a program of matching grants to fund regional and local water supply studies.

This recommendation is strongly supported by the 208 program and it is further recommended that a Cape Cod water supply management plan be prepared as part of the regional water quality planning program to assure coordination between water supply and water quality considerations. The regional water supply management plan would evaluate the following areas as part of the overall planning program:

a. Present water system capacity and future expansion plans
b. Projected water supply needs for twenty year planning period based on water quality considerations
c. Identification of specific sites for future wellfields
d. Coordination of water utilities in meeting expansion needs and management practices
e. Private vs. public ownership of water utilities
f. Funding sources for expansion of system or for protection of well recharge areas
g. A mechanism, or authority, for coordinating water withdrawal possibly for all wells over 50,000 gpd capacity.
h. Regulating inter-town transfers of water on the basis of hydrologic analysis by USGS
i. Improving water conservation through such measures as modifying rate schedules
g. Implementing protective measures for present and future public wells
h. Environmental impacts of future water withdrawals

The preparation of this regional plan should utilize information provided by the USGS study and would be based on a full public participation program. While the preparation of a regional water supply management plan is a very important step in improving the management and protection of the Cape's groundwater, the possibility for state or federal funding is expected to be limited in the next few years. In the interim, the 208 program should assist towns in implementing land use management recommendations and will work, within its staff limitations, to encourage inter-town water supply coordination.

The 208 plan recommends the following actions be taken to improve water supply management on Cape Cod:

FEDERAL ACTION

1. EPA should provide funds to states to carry out long-term water supply planning and management programs as recommended by the Mass. Water Supply Policy Study. Cape Cod should be designated as a watershed area for planning under that proposal.

2. USGS should continue its Cooperative Agreement with CCPEDC to assure the full utilization of the information developed in its comprehensive study of Cape Cod and to assist CCPEDC in developing a regional water supply management plan.

3. The National Park Service should work closely with CCPEDC through its Water Resources Advisory Council and with the towns of Provincetown, Truro Wellfleet and Eastham to initiate an immediate water supply planning effort for the lower Cape area.

4. The National Park Service should continue to financially support the work of USGS in maintaining its Cape Cod monitoring system and in utilizing the information developed in the USGS Comprehensive Study for continued analysis of water supply problems on the lower Cape.

5. EPA should seek the participation of CCPEDC and its Water Resources Advisory Council in evaluating the designation of Cape Cod as a Sole Source Acquifer under the Safe Drinking Water Act.

STATE ACTION

1. DEQE Water Supply Division should utilize the USGS model and should coordinate with the 208 program in evaluating requests for new wells or increasing the pumping capacities of present wells. The Water Supply Division should also encourage water utilities to implement the 208 recommended land use protective measures for all public wells.

2. State should provide funds to CCPEDC to prepare a Regional Water Supply Management Plan in accordance with recommended policies in the Mass. Water Supply Policy Statement.

3. The Water Resources Commission should provide funds and/or assistance to local water utilities to acquire land for protection of public wells, to develop new wells, to rehabilitate and improve facilities and equipment, to modify rate schedules and to install meters on all services.*

4. The Water Resources Commision should carry out a long-range water supply planning program that is coordinated with regional and local planning efforts as well as other state and regional programs such as sewer facility construction and Coastal Zone Management. Public participation should be an integral part of this ongoing program.*

5. DEQE and the Water Resources Commission should encourage towns to use water sources within their own boundaries. Before allocation of water resources between towns, the receiving town should be required to demonstrate, pursuant to MEPA review, that environmental impacts are within acceptable limits and that local options have been exhausted, including supply augmentation within the town, watershed management, and effective water conservation measures.*

6. DEQE should fund a study of water quality within Otis AFB to determine whether or not the area may serve as a future water supply development area or as a potential site for wastewater or solid waste management facilities.

* Based on recommendations of the Mass. Water Supply Policy Statement

REGIONAL ACTION

1. CCPEDC should seek funds in its annual county budget request to continue its Cooperative Agreement with USGS, to continue monitoring USGS installed wells and to utilize the USGS computer model for regional and local water supply planning.

2. CCPEDC should seek funds to prepare a Regional Water Supply Management Plan for Cape Cod from state and federal sources.

3. CCPEDC, through its Water Resources Advisory Council, should assist towns to coordinate future water supply development plans and to implement the water supply protective measures recommended in the 208 plan.

4. CCPEDC should further examine the possibility of designating Cape Cod as a Sole Source Aquifer and should work with EPA in its consideration of such a designation.

LOCAL ACTION

1. Towns should cooperate in regional water supply planning efforts through the Water Resources Advisory Council. Towns should implement the water supply protective measures and the water conservation efforts recommended by the 208 plan.

Non-Point Source Controls

Non-point sources of pollution are those sources that do not come from an identifiable discharge point or pipe. Point sources of pollution discharge directly from a pipe, usually into a river, lake or the ocean. Point sources of pollution such as sewage treatment plant and industrial discharges are of major concern in most parts of the state and nation. On Cape Cod, however, the major source of water quality degradation is from non-point sources of pollution.

Wastewater from septic systems is the major non-point source of pollution on Cape Cod. Measures to control this source of pollution are discussed in the "Wastewater Management" section of the final plan. In this section, controls for the abatement of other non-point sources of concern to the Cape are recommended. These non-point sources are storm water runoff from urbanized areas, construction-related activities, agricultural activities and the use of fertilizer and pesticides, oil and gasoline leaks and spills, salt water intrusion and sanitary landfills.

As indicated in the previous section, non-point sources of pollution in areas critical to water quality should be controlled primarily through the implementation of 208 land use recommendations. The abatement controls recommended in this section, should also be implemented to minimize the impacts of non-point sources on the overall water quality of the region.

Landfills

A number of Cape Cod towns face the problem of relocating or expanding their landfills as present landfill areas will become exhausted in the next few years. Landfills are recognized as a major threat to water quality for both ground and surface waters (see pp. 3-51 to 3-54 of the draft plan). The proliferation or intensification of these pollution sources by continued reliance on solid waste disposal by landfill is not an acceptable solid waste management approach on Cape Cod.

As indicated in the draft plan, pp. 5-17 to 5-18, landfill operation is regulated by DEQE under Chapter 111 of the Mass. General Laws. Compliance with the state regulations currently varies from one town to another. Cape towns are generally not able to comply with the regulation requiring the use of impervious cover. The lack of availability of this material locally and the cost of purchasing and importing it from other areas has caused many towns to use sandy cover material in their landfill operations. Percolation is facilitated by this practice, and increased generation of leachate results, intensifying the potential hazard to the groundwater supply.

The regionalization of solid waste disposal facilities appears inevitable as operational costs escalate and improve the economies of scale to be gained in a regional facility. Further regionalization would eliminate the major pollution sources caused by separate town landfills. However, regionalization that results in a single regional landfill site still poses a major water quality threat to the areas downgradient of such a site. The minimization of this threat through resource recovery is the method of waste disposal that is recommended by this plan and is the preferred method of the State Department of Environmental Management, Bureau of Solid Waste Disposal.

The Bureau of Solid Waste Disposal is working towards a state-wide system of major regional resource recovery facilities. The nearest to the Cape is to be sited somewhere in southeastern Massachusetts. Although consideration of a minor facility is indicated for Cape Cod, there is considerable fluctuation in the solid waste produced by the winter population of 130,000 and the summer population of 380,000. Designing a cost-effective facility capable of handling the fluctuation of generation rates does not seem practical. From a political perspective, the assured state priorities (urban areas) and the competitive capability of the Cape in seeking funding assistance for construction puts the possibility of a Cape facility in the distant future.

While the potential for a major regional resource recovery facility seems unlikely in the near future, there are a number of alternatives available to reduce the volume of solid waste that must be landfilled. Further efforts in the area of recycling could make a considerable contribution to this volume reduction effort. In addition, there are alternatives such as utilizing the rail lines to transport solid waste off the Cape to the nearest regional facility. CCPEDC and other supporters have succeeded in preventing the abandonment of the rail lines by Penn Central and have secured state assistance in rehabilitating the rail system to current standards. The future of rail to transport solid waste off Cape to the nearest state regional facility has been considered in these efforts.

Recognizing that there is a great deal of work and time required to consider all disposal alternatives and to implement a chosen alternative, the CCPEDC has voted to create a 15-town Regional Solid Waste Management Advisory Committee to examine the feasibility of regionalization. The work of this committee should be guided to produce intermediate forms of regionalization that will be compatible with implementing the ultimate disposal approach, preferably transporting the solid waste off-Cape or establishing a regional resource recovery facility.

The boards of selectmen are appointing representatives to this committee and it is anticipated that the work of the committee will get underway in October, 1978. Because CCPEDC has no special funds and limited staff available for this effort, it will rely on technical assistance provided by the Bureau of Solid Waste Disposal.

The Bureau of Solid Waste Disposal is presently involved in the development of a state solid waste management plan under the Resource Conservation and Recovery Act of 1975 (RCRA). This effort also involves DEQE, primarily its Division of Air and Hazardous Materials (DAHM) and the Division of Water Pollution Control (DWPC). A state plan, under RCRA must prohibit the establishment of new open dumps (to be defined under the act), provide for the closing or upgrading of all existing open dumps, provide for resource conservation or recovery and for solid waste disposal in sanitary landfills (to be defined under the act).

DEQE is currently working on a number of plan elements. DAHM will be conducting an inventory of open dumps and evaluating the findings of this inventory in FY 79. DAHM also plans a more stringent program to enforce the state landfill regulations in FY 79 to be consistent with the goals of RCRA.

Due to the draft criteria for classification of solid waste disposal facilities issued by EPA, DEQE anticipates that it will be revising the state landfill regulations. It is likely that these changes will result in more stringent regulations to meet the EPA criteria. Subsequently, increased enforcement of the regulations can be expected as part of the state's efforts to comply with the intent of RCRA.

The act also stresses the importance of hazardous waste management, setting up standards for the generators of hazardous waste and authorizing state hazardous waste programs. Under this section of the act, DEQE has a major effort underway to establish a hazardous waste disposal facility in Massachusetts. The state's consultant in this program has developed site selection criteria and is in the process of evaluating a number of potential sites for the disposal facility.

Another important element of RCRA is its emphasis on regional solid waste management solutions. Due to the limited planning funds available under the Act, funds were not available to prepare regional plans. A RCRA Task Force was formed to coordinate the efforts of the various involved state agencies and it is the intention of the Task Force to more specifically define the role of regions in solid waste management as the state plan progresses.

A major aspect of the Bureau of Solid Waste work under RCRA is in assisting regions in developing plans for a network of major resource recovery facilities. At the present time the Bureau is working in four areas in the state to establish such facilities. Since the state must rely on private industry to contract and operate these facilities there is a major emphasis that the volume of solid waste generated in the region be sufficient for the facility to operate profitably. The need to maintain reasonably uniform waste flow effectively discourages the siting of such a facility on the Cape. However, the Bureau of Solid Waste can also provide technical assistance to regions that want to improve solid waste management through resource conservation approaches that are compatible with state policy and RCRA.

While it is difficult at this point to assess the impact RCRA will have on solid waste management in Massachusetts (many aspects of the act have not been clarified through the required regulations as yet) it appears clear, that the intent of the Act is to reduce the water quality impacts and other environmental hazards of present solid and hazardous waste disposal practices. The regulations that result from the Act are anticipated to be considerably more stringent and will, in the coming years, make alternatives to current landfill practices more economically attractive.

It is the conclusion of the 208 program that sanitary landfills pose a serious water quality threat and that the following actions should be taken to minimize this threat on Cape Cod:

FEDERAL ACTION

1. While RCRA is a major step in recognizing the problem of solid waste disposal throughout the country, EPA has been late in meeting the time requirements of the Act in promulgating regulations. It is the recommendation of this plan that EPA make a concerted effort to speed up the promulgation of regulations under RCRA to facilitate state action on its provisions. It is also recommended that EPA seek additional funds to encourage full implementation of the Act.

2. It also appears that while RCRA addresses a major nationwide problem, that the program is grossly underfunded and the Office of Management and Budget should investigate, in cooperation with EPA, the need for additional funding to make this Act more fully implementable.

STATE ACTION

1. DEQE should strictly enforce the state landfill regulations. Additional personnel in the Lakeville office would be required for adequate inspections in southeastern Massachusetts including Cape Cod. Since DEQE's FY 79 budget request does not include these additional personnel, additional funds should be sought in subsequent years. While DEQE plans to increase its efforts in enforcement by adding new vehicles it seems unlikely that such an approach can be effective with the limited staffing now available. It is also suggested that DEQE provide additional technical assistance to towns to help them comply with the state landfill regulations, with greatest concern being placed on those aspects that serve to protect ground and surface water quality.

2. DEM and DWPC should place a high priority on selecting a site and establishing a hazardous waste disposal facility as soon as possible. DWPC should also establish regulations for a manifest system under RCRA for the disposal of hazardous wastes. It is likely that small quantities of hazardous wastes are presently being disposed of in sanitary landfills on Cape Cod, particularly pesticides, gasoline, oil and other petroleum products. The vulnerability of Cape Cod to oil spills should be noted together with the unique problem posed by the disposal of materials generated by oil spill clean-up operations. While there is no acceptable site for the disposal of hazardous materials at the present time, DWPC should provide guidance to towns in the collection, storage and disposal of these materials. If collection facilities are planned, they can be utilized when the state establishes its hazardous waste disposal site. Hazardous waste disposal facilities must not be sited in Barnstable County. Interim collection and disposal procedures should be compatible with and lead to transporting such wastes off-Cape for disposal in the state hazardous waste disposal facility.

3. While RCRA emphasizes the regional role in solid waste management, the State's RCRA Task Force has not actually involved regions in solid waste management planning. While it is understood that planning funds are limited, it should be recognized that solid waste management will most likely be carried out on a regional basis and, therefore, a greater regional role in the state plan is needed.

4. It is recommended that the Bureau of Solid Waste further explore alternative means of financing resource recovery facilities other than through private industry. The ability of a region to deal with solid waste disposal is a public problem and should not be totally dependent upon private industry for a solution. The possibility of state funding assistance through a bonding capability along with other funding approaches (including the state pressuring EPA for federal assistance) should be explored along with any necessary legislation to provide such assistance to regions.

5. DEQE should require a landfill monitoring system whenever a town requests approval of an expansion or final landfill plan.

6. DEQE should investigate present leachate collection and treatment technologies as well as conducting research into new technologies. Such a program is needed to determine the effectiveness and practicality of this approach to reducing the water quality impacts of landfills.

7. Otis Air Force Base is considered as a potential regional site for a solid waste disposal facility in the C. E. Maguire Solid Waste Management Plan for Cape Cod. In the past, DEQE personnel have suggested that the use of Otis for such a facility would jeopardize a major future water supply source. Water quality information in the vicinity of Otis indicates that contamination of the aquifer may have already taken place from undetermined sources. It is the recommendation of this plan that DEQE support, through the Water Resources Commission, the further study of the present water quality conditions in the area and the use of Otis as a potential major solid waste disposal site for Cape Cod.

8. The Executive Office of Environmental Affairs should explore various methods of encouraging businesses to reduce excess packaging materials, possibly by taxing or prohibiting certain packaging techniques and materials.

9. EOEA should also encourage legislative support for passage of a State Bottle Bill. This legislation was strongly supported by Cape voters on a referendum question in 1976.

REGIONAL ACTION

1. CCPEDC is supporting the efforts of its newly created Regional Solid Waste Management Advisory Committee with available staff resources emphasizing the need for local cooperation to develop an implementable regional approach. It must be recognized that there are limited federal and state resources to assist such an effort and that the towns must rely on their own resources for acceptable short-term improvements. It is suggested, that CCPEDC investigate any available sources of funds to support its solid and hazardous waste planning efforts.

2. CCPEDC should assist towns in planning the expansion or relocation of landfill facilities in evaluating water quality considerations. It should be recognized that such actions will not be necessary if the towns and the state make the needed cooperative commitments to a regional approach.

3. CCPEDC should encourage and assist towns to monitor their landfills as discussed in the "Water Quality Assessment" section.

4. The efforts of the Cape Cod Recycling Committee have been an important contribution to improving solid waste disposal on the Cape. The Regional Solid Waste Management Advisory Committee should seek the assistance of this group in its planning effort. Recycling must be an integral part of any regional resource recovery facility.

5. The establishment of any future regional solid waste disposal facility must be coordinated with water resource planning. The Regional Solid Waste Management Advisory Committee and the Water Resources Council should work together in their respective planning efforts. The location of a regional disposal site, its design and construction, are particularly critical to water quality. Such a facility will hopefully employ a resource recovery technique but for those materials that will still need to be landfilled, the regional landfill site should meet all state standards. In addition, a regional landfill should have a leachate recovery and treatment system.

TOWN ACTION

1. While a regional solid waste disposal system must be implemented as soon as possible, it is likely that such a plan will not be fully realized for the next 4-5 years. During this period towns should make every effort to extend the life of their present landfills to avoid the need to create new landfill sites and to minimize the impacts of the landfill by strictly complying with state landfill regulations. Towns should:

a. encourage the recycling of materials and should set aside areas in the landfill for the disposal and storage of recyclable materials or should cooperate in establishing sub-regional recycling centers.

b. employ landfill methods that will most efficiently utilize the present landfill area including compacting and stacking.

c. encourage homeowners to compost all organic materials such as garbage, leaves and grass.

2. Towns should install a landfill monitoring system in cooperation with CCPEDC.

3. Towns should locate all abandoned landfills and evaluate their current impacts on water resources in cooperation with the ongoing 208 program staff. If the abandoned landfill poses a threat to important water resources due to continued leaching through the site, the town should consider sealing the landfill with an impervious cover to minimize its long-term water quality impacts.

4. Towns should regionalize septage disposal facilities as discussed in the "Wastewater Management" section.

Storm Water Runoff

From Urbanized Areas and from Construction-Related Activities

As development increases there is an increase in the amount of impervious surface and, therefore, an increase in stormwater runoff. In general, stormwater is collected through the use of storm drains or catch basins which discharge directly to surface waters or to groundwater. The quality and quantity of stormwater runoff depends on the intensity and duration of the storm, as well as the duration between storms, the land uses in the area of drainage and the land formation of the area.

The water quality impacts of stormwater runoff entering ponds, coastal embayments or drinking water supplies can be severe. As discussed on pp. 3-43 to 3-47 of the Draft Plan, runoff from urbanized areas can have a pollutant loading that is greater than secondary treated effluent. Recent studies have also shown the presence of toxic organic substances in urban runoff. In addition, the process of urbanization involves construction and during construction erosion caused by runoff can add sediment to surface water bodies with the resultant water quality problems discussed on pp. 5-22 to 5-23 of the Draft Plan. Sand and gravel pit operations are another related problem discussed on pp. 5-22 to 5-23 of the Draft Plan.

Controlling the water quality impacts of stormwater runoff is an immense and costly problem. Traditionally, stormwater runoff has been considered a non-point source of pollution. At the present time, storm drains are not regulated under the NPDES permit process in Massachusetts. Due to recent court action, EPA has been required to promulgate regulations that would include storm drains under the NPDES program. The regulation, published in the Feb. 4, 1977 Federal Register, establish a program based on the concept of a "General Permit." Under the regulations the state would establish "General Permit Planning Areas" (GPPA) and issue a "General Permit" for the area that would apply "to all owners and operators of separate storm sewers." The general permit would require such persons to employ "best management practices" (BMP) defined by the state program. At the present time the state has taken no action toward implementing such a general permit program.

The 208 program conducted a very limited sampling program to evaluate the runoff constituents with various land uses. Substantial contamination with cyclic hydrocarbons, nitrates, salts and metals was found. However, extensive sampling and additional study is needed to determine the extent of water quality problems caused by runoff on Cape Cod.

Best management practices can be applied not only to the stormwater runoff problems resulting from existing developed areas but also to prevent and control stormwater runoff problems that could result from future development. Since the state must develop best management practices for the control of existing storm sewers and drains, it is suggested that the following practices be evaluated to determine their appropriateness for small urbanized areas such as those on Cape Cod:

1. Improved street cleaning (frequency of street cleaning for optimum effectiveness should be determined),

2. Regular cleaning of catch basins.

3. Maintaining and monitoring outfall pipes,

4. Elimination of illegal sewage discharges to the storm drains.

While it is presently not clear how effective such BMP's may be in controlling pollution from existing areas, it is possible for towns to take action to control runoff problems in future development.

Since collection devices tend to concentrate pollution from runoff, it is advisable to minimize the use of storm drains by a source control or preventive approach. Towns have considerable authority through their subdivision regulations and zoning bylaws to help prevent water quality problems from increased runoff and the erosion and sedimentation that can result. It is the conclusion of the 208 plan that the control of storm water runoff from increasing urbanization rests largely with local planning boards and conservation commissions adopting preventive measures recommended in the following section, "Local Action."

FEDERAL ACTION

1. If the DWPC requests delegation by EPA of the NPDES program as a state responsibility EPA should require the state to establish a general permit program for storm drains.

STATE ACTION

1. DWPC should establish a general permit program and should consider Cape Cod as a General Permit Program Area. Best management practices to be required under the program should also be established. Enforcement of such a program, including the necessary sampling, would require considerable increases in state staff. It is, therefore, recommended that storm drains discharging into surface waters not meeting their state water quality classification should be given priority. If found to be polluting, these drains should be placed under the NPDES permit system.

2. MDPW should modify its policy of discharging storm drains from highways to surface water bodies on Cape Cod. Such discharges can cause degradation of ponds and groundwater. Storm drains and catch basins discharging upgradient of public well supplies may jeopardize water quality from road salts and other pollutants in highway runoff. When undertaking modifications to highways, the MDPW should modify drainage systems to direct runoff away from these areas in coordination with the 208 water quality planning program.

REGIONAL ACTION

1. CCPEDC should assist and encourage the town in making changes to their subdivision regulations and zoning bylaws suggested by the 208 plan.

2. Additional investigation of various runoff control techniques appropriate to Cape Cod should be examined in cooperation with the town engineers (such as utilizing pervious cover materials, drainage methods using surface infiltration) as part of the continuing 208 program.

3. The Barnstable Conservation District and Soil Conservation Service should provide assistance to towns in developing criteria for erosion control plans and in evaluating erosion control plans submitted by developers.

LOCAL ACTION

1. Towns should adopt performance regulations as part of their subdivision regulations that would require developers to estimate the increase in runoff that will occur as a result of the development and require the developer to include measures to maintain runoff at its pre-development rate or at some acceptable increased proportion. Such a performance regulation is a part of the Watershed Protection District Bylaw in Appendix B.

2. Towns should consider limiting the amount of impervious surface allowed to a certain percentage of the total land area of the development through the subdivision regulations for residential development and for various uses in the zoning bylaw. In recharge areas of municipal wells it is recommended that not more than 10% of lot area be covered with impervious materials. Planning boards should allow and encourage the use of non-paved surfaces and pervious surface materials in parking lots to reduce runoff and facilitate infiltration. Such non-paved surfaces should be designed so that erosion, ponding and dust problems are controlled. Particularly for businesses that have seasonal fluctuations in parking area use, the parking area that is anticipated to be used year-round may be paved, but summer parking areas should be unpaved.

3. Developers should be encouraged to utilize natural surface infiltration to the maximum extent feasible and should be required to install a grit chamber or other means of retaining solids and an overflow system (solids are thus removed so that the storm water will not be slowly filtered through the material intensifying the pollution load). The town engineer in reviewing the developers plan, should evaluate whether the plan meets these requirements and suggest any necessary modifications.

4. It is suggested that conservation commissions or boards of health that suspect a storm drain may be the source of water quality degradation in a specific water body should have the water from the storm drain tested by the Division of Water Pollution Control. If the water quality information gathered through such a program indicates that a specific storm drain is causing a serious pollution problem the conservation commission with its authority under the Wetlands Protection Act should require the owner to remove the storm drain and replace it with a surface infiltration system. In certain cases the owner of the storm drain may be the town or even the state. If it is suspected that direct

discharges or overflows of sanitary wastes are entering the storm drain, the board of health should order the owner to abate the problem by installing or upgrading his on-site disposal system under the authority of Title 5.

5. Planning Boards should require through the subdivision regulations that developers submit an erosion control plan that addresses the following issues (EPA, 1977).

a. Disturbed areas should be kept to a minimum (the development should preferably be adapted to the site requiring a minimum of clearing and grading) and areas that are exposed should be only those areas which are actively being developed;

b. Disturbed areas should be stabilized in some manner as soon as possible (it is suggested that the developer be required to retain sufficient topsoil to stabilize areas);

c. Disturbed areas should be protected from stormwater runoff;

d. Stormwater runoff velocities should be as low as possible;

e. Sediment should be retained on site either through vegetative or mechanical measures.

These principles have been developed by the SCS and towns should utilize the assistance of SCS through the Barnstable Conservation District in developing requirements for erosion control plans and in evaluating the erosion control plans submitted by developers.

6. Similar to the erosion and sedimentation problems posed by construction sites, the related activity of sand and gravel pit operations can also cause sedimentation problems. While most properly operated pits drain inwardly, abandoned pits and those that are operated improperly can have severe erosion problems. Towns should have an earth removal bylaw (either a town bylaw under Chapter 40 or a zoning bylaw under Chapter 40A) that regulates the operation of the pits according to best erosion control practices and which requires the reclamation of used sites. In addition, earth removal should be permitted only to a depth of four feet above mean groundwater elevation. A model bylaw is presented in Appendix C (SRPEDD).

Runoff from Agricultural Uses and from Fertilizer and Pesticide Use

The water quality problems from agricultural activities have been documented in many areas of Massachusetts. However, because agricultural activities are very limited here on the Cape, the 208 program did not conduct a specific water quality sampling program to determine the extent of this problem on Cape Cod.

It has been estimated by the Soil Conservation Service that approximately 150 acres of land on the Cape is devoted to commercial fruit and vegetable farming and approximately 1000 acres are active cranberry bogs. Small bogs are located in nearly every Cape town but the major active bogs are located in Barnstable, Yarmouth, Falmouth, Bourne, Harwich and Brewster. There are no commercial foresting or livestock operations on the Cape. There are, however, numerous golf courses, mapped on Map 5.2 in the draft plan, which are known to be substantial fertilizer and pesticide users. In addition, pesticides and herbicides are used for utility line areas, parks, cemetaries and roadsides. Other agricultural uses include commercial poultry farms, small vegetable farms, and backyard horses, cattle and poultry. The home use of fertilizers for lawns and gardens may also be a significant source of pollution (Long Island 208 Program).

Due to the limited nature of agricultural use on the Cape, the 208 water quality assessment did not specifically sample areas that may be affected by agricultural use or other uses that involve large amounts of fertilizer and/or pesticides. Further, the testing for toxic organics that might result from pesticide use is very expensive and beyond the funding capability of the 208 program.

The Cranberry Experiment Station does conduct testing upon request. Sampling information from the Experiment Station, as discussed in the Draft Plan, indicates that pesticides used on the bogs generally become bound in the soils and do not pose a major threat to ground and surface waters. There also appears to be considerable self-interest involved in cranberry growers utilizing only the recommended amounts of pesticides. The Ocean Spray Cranberry Company, a cooperative used by major Cape growers, spot checks growers' crops to detect pesticide residues and to reject contaminated berries. (OCPC, 1978)

The Division of Water Pollution Control, responsible for non-point sources of pollution such as agricultural activities under the Mass. Clean Waters Act, does not at the present time carry out any sampling program specifically for agricultural uses. If the DWPC receives delegation under the Federal Clean Waters Act for the NPDES program (as discussed in the Section on Runoff from Urbanized Areas and Construction-related Activities), it could establish a General Permit Program that would prescribe best management practices. DWPC could then conduct a representative sampling program and require compliance with the BMP's (similar to storm drain general permit program). At the present time, DWPC has made no plans to initiate such a general permit program.

With a general lack of water quality sampling information in this area, there is no evidence, at this time, that agricultural activities and the use of pesticides and fertilizers are causing a serious water quality problem on the Cape. The 208 program, therefore, recommends a two fold approach to these non-point sources as potential water quality threats:

1. Further water quality testing to determine the degree of the problem.

2. Use of best management practices (BMP'S) to prevent development of water quality problems from these sources.

At the present time a number of agencies are involved and are responsible for the management of agricultural activities and pesticide use in Massachusetts. While none of the agencies is specifically responsible for establishing best management practices, certain agencies have been active in developing best management practices and in encouraging growers to utilize them. The University of Massachusetts Experiment Station in East Wareham has developed BMP's for cranberry growers and carries out an extensive education and information program. A similar function is performed by the Waltham Experiment Station for vegetable and fruit growers.

The Soil Conservation Service directly assists farmers with specific problems and can prepare a "conservation plan" that analyzes the farmer's operations and can suggest the use of improved practices in the areas of erosion control, crop rotation, manure storage and application and irrigation. The Cranberry Experiment Station also helps individual growers on request. Along with the education activities of the University of Massachusetts Experiment Stations, the Barnstable County Cooperative Extension Service conducts its educational activities through workshops, providing educational pamphlets and managing the 4-H clubs.

Growers that want to follow best management practices recommended by these agencies may have to invest in certain types of equipment such as irrigation systems for cranberry bogs. To assist growers in following a conservation plan prepared by SCS, the Agricultural Stabilization and Conservation Service (ASCS), shares the cost (up to 50%) of practice establishment with growers up to $2,500/yr. Here on the Cape a committee of five local growers make recommendations on applications for these funds in cooperation with the SCS. In some cases, the ASCS funds are not sufficient to carry out a particular control measure. Under an EPA-Small Business Administration agreement, farmers may also obtain loans at an approximate 6 percent interest rate for a project certified by EPA as a pollution control measure (OCPC, 1978).

Finally, in the area of pesticide use, the State Pesticide Control Board in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended (PL 92-516), conducts courses and administers examinations for commercial applicators. All commercial applicators must be certified to use "restricted use pesticides" and the certification process involves the applicator demonstrating competence in the type of pesticide operation they conduct.

The 208 plan concludes that additional investigation of the water quality impacts of agricultural uses and the use of fertilizers and pesticides on Cape Cod is needed. The following recommendations address this problem and the importance of preventive management through the use of best management practices:

STATE ACTION

1. DWPC and DEQE should investigate the water quality impacts of various agricultural activities in the state through an extensive sampling program. Based on the information gathered through such a sampling program and the assessment of present water quality information available in this area, DWPC should evaluate the need for a general permit program. While such a program appears to be a good control approach for agricultural sources of pollution, there is not suffi cient information on the Cape Cod region to warrant a recommendation that a statewide general permit program is needed.

2. Whether or not a general permit program is established, it would be extremely helpful if a formal system of coordination between agencies were developed and a single agency were charged with the responsibility for establishing and updating best management practices. DWPC would be a logical choice since it has responsibility for controlling non-point sources in the state. However, DWPC should rely on the expertise of the University of Massachusetts Experiment Stations and the SCS in establishing BMP's rather than duplicating the work of these agencies. A Memorandum of Understanding between these agencies could be the mechanism used by DWPC to gain the assistance of these agencies in establishing state BMP's and in providing ongoing coordination in this area. Further, these agencies along with the Barnstable County Cooperative Extension Service and County Conservation District should continue their educational and technical assistance activities following the BMP's adopted by DWPC.

3. DWPC should work with SCS and the County Conservation District to encourage any farmer who is causing a known pollution problem to abate the problem. Funds to conduct the necessary test to establish the source of a problem should be available for this purpose. Should the farmer fail to take abatement action after such encouragement, DWPC should order such action.

REGIONAL ACTION

1. The Barnstable County Conservation District along with SCS should continue to encourage growers to use best management practices. Since only voluntary compliance is required at the present time, the Conservation District should provide the technical assistance, through SCS, to growers to follow BMP's and to seek funding through ASCS to implement BMP's. The Conservation Districts and SCS should also apply "peer pressure" to farmers that are causing a known pollution problem. This type of concerted encouragement and assistance should be succesful in obtaining voluntary compliance with DWPC approved BMP's.

2. CCPEDC should further investigate the potential water quality problems posed by golf courses, particularly within the recharge areas of municipal wells and should develop an appropriate program of monitoring these sources of potential groundwater pollution.

3. The Barnstable Conservation District should cooperate with the CCPEDC to further investigate the extent of agricultural activities on Cape Cod as well as large users of pesticides and fertilizers.

4. CCPEDC should encourage DWPC to conduct further water quality sampling on Cape Cod to determine the water quality impacts of various agricultural uses and the use of fertilizer and pesticides. Should this information indicate that a substantial water quality problem does exist, CCPEDC should encourage DWPC to establish a general permit program for the agricultural uses in question.

5. The Barnstable County Cooperative Extension Service (Cooperative with U. Mass. and USDA) should provide information on pesticide and fertilizer use to growers and homeowners that emphasizes mimimum use considering water quality concerns.

LOCAL ACTION

1. Conservation Commissions that suspect a specific agricultural use is causing serious degradation of a water body or the groundwater should request DWPC to take water quality samples in the area. If DWPC finds that the agricultural use is causing a pollution problem, it can order the owner to abate the problem under the authority of the Massachusetts Clean Waters Act.

GROWER ACTION

1. Cranberry growers, and other small farmers should strictly follow the BMP's provided by the University of Massachusetts Experiment Stations. Technical assistance in following these BMP's can be obtained from SCS through the Barnstable Conservation District.

2. Individual home garden growers should use the minimum amounts of fertilizers and pesticides needed to maintain a healthy garden. To the maximum extent possible, natural pest control methods should be used.

3. Homeowners should contact the County Extension Service for advice in using pesticides and fertilizers. Location of home gardens should be as far away (preferably downgradient) from private wells and surface water bodies as possible. Excess amounts of pesticide and fertilizers should be stored for later use or disposed at the sanitary landfill (at some future time special disposal areas for such materials may be set aside at landfill sites). The Extension Service should prepare a list of commonly used pesticides and state whether or not they are persistent, and whether they tend to move through soil to groundwater. Products which are preferred for use in a wellfield area, public or private, should be indicated.

Road Salt Storage and Application

As stated in the Draft Plan, the use of sodium chloride, for deicing roads and highways, and the outdoor storage of road salts are two major sources of potential sodium contamination of groundwater supplies. During the public review period it has become evident that most towns do not store road salts in enclosed sheds and in fact, even the Massachusetts Department of Public Works (MDPW) has some outdoor storage facilities on the Cape.

Chapter 85 Section 7A of the Massachusetts General Laws states "No person shall store sodium chloride, calcium chloride or chemically treated abrasives or other chemicals used for the removal of snow or ice on roads in such a manner or place as to subject a water supply or groundwater supply to the risk of contamination. The Department of Environmental Quality Engineering, hereinafter called the department, in consultation with the Department of Public Works, may issue regulations as to place or manner of storage of such chemicals and may, by specific order, in a particular case regulate the place where such chemicals may be used for such purpose. Any violation of this section or order issued hereunder shall be punished by a fine not to exceed fifty dollars per day."

Regulations under this Act have been drafted by EOEA and suggested for consideration by DEQE. These draft regulations would require all towns to store road salt stock piles in a storage shed within one year of the issuance of the regulations. There has been considerable delay in adopting the regulations, presumably due to the lack of manpower needed for enforcement.

The act also calls for persons using more than one ton of snow removal chemicals to report annually the amount of chemicals used and the amount of chemicals on hand. While DEQE has requested these reports from municipalities and large users, compliance has been lax. DEQE has made little effort to enforce this section of the Act or to follow up on any problems that may be indicated by the reports, again due to lack of staff.

In Fiscal Year 1977, the MDPW appropriated $1,000,000 to provide assistance to towns to construct road salt storage sheds. Of the 400-500 municipal storage sheds needed throughout the state only 30 sheds were funded with these limited funds. Priority was given to those towns where present storage practices have already caused water supply contamination or pose an imminent threat. While 7 of the 15 Cape towns applied for funds under this program, no Cape town was awarded funds for facility construction. While the MDPW will seek funds to continue this program, lack of sufficient funds will severely limit meeting the statewide need for sheds in a reasonable period of time.

Many citizens also raised concern during the public review period over the application of road salts on the Cape. In discussing with the MDPW current application practices on Cape Cod, the 208 staff was informed that approximately 90% of the DPW Repair Section Crews apply a lower level of salt mixed with sand than is used in the rest of the state. It is

also recognized that there is a need for fewer applications of salt on the Cape due to the higher temperatures and less frequent perma-frost conditions. However, it is the MDPW policy that sand/salt mixtures be applied at the beginning of a storm to maintain a salt solution on the roadway that will facilitate plowing and to avoid the formation of a snow pack on the road surface that would be very difficult to remove. The application of road salt is not used to substitute for plowing but to maintain plowable conditions. The MDPW also recognizes that traffic which tends to cause snow packing is less on the Cape and, therefore, fewer salt applications are needed than in other sections of the state.

Route 6, a State maintained highway, runs near the top of the Cape's aquifer through most of its length, and is a major concern to a number of municipal wellfields. Other major state owned highways are within recharge areas. In addition, town maintained highways and roads also pass through the recharge areas of municipal wells and through areas relying on private wells. In fact, the MDPW uses only 1/3 of all road salts in the state, the remaining 2/3 is used by municipalities, businesses and private individuals. Thus, further attention to municipal road salt storage and application practices is needed.

The Final Environmental Impact Report for the Snow & Ice Control Program of the MDPW (July 1978), includes a cost-benefit analysis of the MDPW's use of road salts. While there are substantial economic benefits to maintaining a high level of service through the present MDPW road salting practices, there are also costs that must be borne by the public of potential water supply contamination, higher repair costs for highway structures, corrosion damage to automobiles, contamination of water bodies and damage to vegetation. The general principles of this cost-benefit analysis can also be applied on the local level in municipal road salt usage. Careful reduction in the use of road salts as practiced by MDPW, can potentially reduce the costs of the town's road maintenance budget and can also reduce these other governmental and private sector costs.

It is the conclusion of the 208 program that further efforts are needed to reduce the use and to minimize the effects of road salts, particularly in areas critical to groundwater supplies. The following recommendations suggest a program of action for the management of road salts as a serious non-point source of pollution:

FEDERAL ACTION:

Since the problem of snow and ice control plagues large sections of the U.S., primarily the northern states, EPA should continue to fund research into methods of reducing road salt use and into the impacts of road salt use on the environment. It is suggested that research into the impacts on ground and surface waters be conducted in cooperation with the USGS.

STATE ACTION:

1. The Mass. DPW should construct storage sheds for all of its road salt stockpiles on Cape Cod. (Truro, Harwich, No. Falmouth) In cases where a present outdoor stockpile is located on land not owned by MDPW (Truro,

Harwich), the necessary land should be purchased, and a storage facility should be constructed within the next two years. Due to the Cape's reliance on groundwater for its sole source of drinking water, it should be considered a priority area for acquiring land on which to construct storage facilities.

2. It is recommended that the MDPW continue its efforts to minimize the use of road salts, particularly on Cape Cod, and to stress the importance of careful supervision of road salt application. This supervision of maintenance crews can greatly reduce unnecessary reapplications of road salts and maximize the effectiveness of each application.

3. DEQE should issue regulations under Chapter 85 Section 7A of the Massachusetts General Laws to require construction of municipal salt storage sheds where they are needed. In issuing its regulations, DEQE should consider requiring municipalities that have road salt stockpiles within present municipal well recharge areas, within potential water supply development areas or in areas relying on private wells, to either relocate the stockpile to a non-critical area or to construct a salt storage shed according to state specifications. Should the town choose to relocate the stockpile, an acceptable site should be chosen in coordination with the continuing 208 program and the stockpile should be placed on an impervious pad with an impervious cover.

4. DEQE should require compliance with the provision of Chapter 85 Section 7A requiring annual reporting by all major users. This information should be analyzed and possibly used for the development of salt application guidelines.

5. It is recommended that the MDPW maintenance budget include additional funds to upgrade its present snow and ice control equipment, to maintain that equipment on an annual basis and to acquire land needed to construct salt storage facilities. According to the MDPW's Final Environmental Impact Statement $12,000,000 would be needed in the coming fiscal year and an annual allocation of $3,750,000/year (an increase of approximately $1.5 million over the MDPW 1975-76 equipment budget), to maintain an efficient operational level capable of increased control over road salt application. It is recommended that the MDPW Commissioner seek these additional funds from the General Court. It is also recommended that the Cape Cod Delegation to the General Court support the appropriation of these additional funds and seek a priority for equipment improvement on Cape Cod due to its reliance on groundwater supplies.

6. That the MDPW establish a regular program of educational workshops for municipal highway maintenance personnel in proper road salt application and storage procedures based on the series of workshops held in 1977 around the state. It is recognized that such workshops are not a regular part of MDPW activities, but these workshops could contribute greatly in standardizing and improving local practices in the use and storage of road salts. It is further recommended that the MDPW sponsor such a seminar on Cape Cod, on an annual basis, to encourage full local participation. The 208 staff will assist the MDPW in making arrangements for the seminar.

7. It is recommended that the MDPW continue to seek funds to assist municipalities in constructing salt storage sheds and that priorities for these grants within the Cape Cod region be coordinated with the ongoing Cape Cod 208 program.

8. It is recommended that the MDPW consider modifying drainage away from present and future municipal well recharge areas when road repairs or roadside landscaping is executed as part of the maintenance or repair project. It is also suggested that such drainage modifications should be executed as a preventative measure in particularly critical areas rather than as a response to the problem when a municipal well has exceeded the 20 ppm state sodium limit. MDPW should consult with the 208 agency in designing such modifications.

9. In cases where contamination of a municipal wellfield is unavailable because of the lack of a suitable site to which runoff can be directed, the MDPW should build sealed basins to receive and evaporate salt-contaminated runoff.

10. It is recommended that the state collective purchasing office establish specifications, in coordination with the MDPW, for road salting equipment that can be accurately calibrated for application rate, to allow towns to purchase this equipment under the state purchasing system.

11. The MDPW should continue to pursue and to fund research efforts as are currently underway with EOEA and USGS into the potential reduction of road salt use and into the environmental impacts of road salt use in the state.

REGIONAL ACTION:

1. CCPEDC shall assist the towns in identifying the recharge areas of municipal wells and to examine the need for reducing or eliminating road salt use within these areas. CCPEDC will also assist the towns in examining the need for modifying drainage systems within these areas, within staff capabilities.

2. CCPEDC shall cooperate with the MDPW in reducing the use of road salts within the region, in sponsoring educational seminars for municipal highway personnel, in encouraging the structural changes in the drainage systems from state highways that threaten municipal well supplies.

3. CCPEDC will assist the towns in examining present road salt storage facilities and application practices. CCPEDC will sponsor regional seminars and meetings if needed for highway maintenance personnel to exchange information and to learn improved methods.

4. CCPEDC will work to educate the public on the need to reduce road salting for the protection of ground and surface waters, on the need to support additional town funds for equipment and operating budgets that will improve snow and ice control with reduced road salt use, and on the need to reduce driving speeds due to snow conditions.

5. CCPEDC will assist DEQE in its enforcement of Chapter 85 Section 7A by encouraging towns to construct municipal salt storage sheds and by working with towns that wish to relocate salt stockpiles to non-critical areas.

6. CCPEDC will also assist the towns in seeking funds from the MDPW or other sources for the construction of municipal salt storage sheds in compliance with Chapter 85 Section 7A.

TOWN ACTION

1. It is recommended that the towns reduce or eliminate the use of road salts within the recharge areas of municipal wells. The use of sand only within these areas would require the posting of these roads as no salt roads. While it is recognized that there is a potential increased hazard in no salt areas, drivers generally travel more slowly on town roads than highway areas and such posting can help slow traffic down to a safe travel speed. It is also suggested that increased plowing in these areas may be needed to maintain safe road conditions.

If the town chooses to only reduce the level of road salt use within these areas, it is suggested that they do not exceed the sand-salt mixture (approximately 50-50) utilized by the MDPW and preferably use mixture below the MDPW rate. It is also suggested that the town consider using calcium chloride/sodium chloride mix within these areas to reduce the number of applications needed. These reduction measures should also be adopted for areas relying on private well supplies.

2. It is recommended that all towns appropriate funds for the construction of municipal salt storage shed if present stockpiles are within the recharge areas of present wells or in potential water supply development areas. If a town chooses to move the stockpile to a non-critical area (not the preferred alternative) rather than build a storage shed, the relocation site should be chosen in consultation with the continuing 208 Program. It is also recommended that all outdoor road salt stockpiles be placed on an impervious pad and kept under an impervious cover. The cost of a storage shed has been estimated by the MDPW to range from $18,000 for a 40' X 40' shed to $32,000 for a 96' X 40' shed. It should be further noted that salt storage sheds allow the town to reduce salt loss due to runoff, to minimize caking problems and to purchase the yearly supply at the lowest price possible without the problem of prolonged outdoor storage.

3. It is recommended that towns minimize the drainage of road salts into municipal well recharge areas by modifying drainage systems when major repairs to the road are planned. In particular cases where the drainage of a large area is presently discharged into the recharge area of a municipal well and is a suspected source of contamination, the town should provide funds to direct the drainage away from the recharge area.

4. It is recommended that towns purchase the necessary snow removal equipment that can accurately control the level of road salt application. It is recognized that the most cost-effective approach to this recommendation is for towns to purchase salt application equipment that can be calibrated when replacing old equipment rather than special purchase of this equipment. Such equipment should be available for use in municipal well recharge areas as soon as possible.

Gasoline and Oil Storage and Spills

The serious problem of potential gasoline pollution of the groundwater supply was demonstrated this past winter, when an underground storage tank in Truro leaked over 3,000 gallons of gasoline near Provincetown's major water supply wells. Extensive water quality monitoring and pumping tests now indicate that the wellfield is threatened with contamination from the spill and very expensive clean-up operations are needed to remove the gasoline from the area.

For the most part, gasoline leakage has been regarded as primarily a fire or explosion hazard as gasoline can move with the groundwater into underground facilities such as basements or sewers. It must be recognized that gasoline and oil leaks and spills also pose a major threat to drinking water supplies, both public and private wells. Even a very small amount of gasoline or oil can contaminate a water supply well and is very difficult to remove. As the Cape's population continues to grow, the various underground and above ground sources of such contamination will proliferate.

Contamination of groundwater supplies can result from leaks in corroded steel tanks, mechanical damage in a storage system or spillage during transport of the liquid. Of major concern to the program is the underground storage of gasoline and oil since leaks in underground tanks are the most difficult to detect and may go unnoticed for a prolonged period of time.

Underground gas and oil storage tanks are found at many locations including all gas stations (averaging three 10,000 gal. tanks per station), fuel oil companies and highway department garages. Many homes also use underground tanks (500-1000 gal.) for home fuel oil storage.

Under Chapter 148 Section 13, (MGL) the board of selectmen must issue a license to use land for a building or other structure in which flammable materials are stored. Under this law, the Department of Public Safety, Board of Fire Prevention Regulations (FPR) also requires an application for permit and inspection of any storage tank for flammable or combustible liquids at the time of installation or relocation. These permits are issued by the town fire chief and are kept on record at the local fire department or town hall. These permits must be renewed annually.

At the present time, most towns do not require annual inspections of the tanks nor do they require replacement of the tanks after a certain time in the ground. In addition, towns do not issue permits for home fuel oil tanks as required by the regulations. In general, tanks are used until they rust out.

The average life of a steel tank is about 20-25 years depending on the corrosiveness of the area. Cape Cod is considered a highly corrosive area and the life span of a steel tank should be considered to be less than 20 years without protective measures.

There are two procedures that can prolong the life of a tank approximately 15 years. The first is using sacrificial cathodic annodes, where magnesium annodes at the ends of the tank will corrode instead of the tank. This same principle is used on steel hulled ships. The other is by electrically isolating the tank from the surrounding area by means of non-conducting bushings in the tank construction. These devices can be costly and even with these protective devices, engineering studies have shown that 50% of steel tanks fail due to corrosion.

The use of fiberglass or fiberglass coated steel tanks is, therefore, highly recommended since fiberglass is not affected by external conditions which produce corrosion in steel tanks. Fiberglass is also resistant to internal corrosion from condensation, sludge deposits or bacterial activity. When first introduced there were problems with the installation and gaging of fiberglass tanks. Proper installation of fiberglass tanks is particularly critical. However, after ten years of use, installation methods appear to be safe and effective and a reinforcing plate at the bottom of the tank helps prevent cracking from repeating gaging. Ideally, fiberglass tanks should last permanently. While the initial cost of the fiberglass tanks is higher, there are no maintenance costs (such as upkeep of cathodic protection systems) and there are savings in tank replacement costs.

Strict monitoring of the tanks should be enforced so that if a leak does occur, it will be detected and the tank repaired or replaced immediately. Under a recently issued Rule 51 of the Fire Prevention Regulations, accurate daily inventory records must be maintained by all garages, service stations, and other locations which store gasoline or other motor fuel. These regulations issued in September, 1978 are as follows:

"Accurate daily inventory records by means of dip sticking shall be maintained and reconciled on all flammable or combustible liquid underground storage tanks for indication of possible leakage from said tanks or piping. The records shall be kept on the premises available for inspection by any member of the Department of Public Safety, head of the fire department or his designee, and shall include, as a minimum, records showing type of product, daily reconciliation between sales, use, receipts and inventory on hand."

This regulation will be helpful in assuring compliance with Chapter 21, Section 42 of the Mass. General Laws which states:

"Any person who, directly or indirectly, throws, drains, runs, discharges or allows the discharge of any pollutant into waters of the Commonwealth, except in conformity with a permit issued under section forty-three; or who violates any provision of this chapter, any valid regulation, order or permit prescribed or issued by director thereunder; or who knowingly makes any false representation in an application, record, report of plan, or falsifies, tampers with or renders inaccurate a monitoring device or method, required under this chapter, (a) shall be punished by a fine of not less than two thousand

five hundred dollars nor not more than twenty-five thousand dollars for each day violation occurs or continues, or by imprisonment for not more than one year, or by both; or (b) shall be subject to a civil penalty not to exceed ten thousand dollars per day of such violation, which may be assessed in an action brought on behalf of the commonwealth in any court of competent jurisdiction."

The new regulation for maintaining daily inventory records is the most accurate means of detecting leaks. The daily preparation of inventory control records will assist the operator as he will be able to recognize and determine the source of unaccountable losses and thereby reduce his stock losses. Thus, such an inventory procedure achieves a high level of safety and pollution control. A model inventory report form is included in Appendix D.

If a tank leak is suspected, a more accurate test system is required. In the past an air pressure testing technique has been used. This test is permissible for pipes and pipe fixtures, but should not be used on tanks containing inflammable liquids. With the air testing there is danger of causing a tank rupture (by putting more than 5 psi in the tank), and the expulsion of gasoline through normal openings. The results are also very inconclusive. Air pressure varies greatly with the temperature and with vapor pressure within the tank. Any pressure loss in tanks, even if the loss is due to liquid loss, depends on the volume of air in the system. Air pressure testing should be discouraged.

A more accurate indicator of liquid volume loss in an underground tank is the Kent-Moore testing system. This method, developed by the American Petroleum Institute, is very precise, although complicated and more expensive than the air pressure test. Briefly, the tank is filled with gasoline, then a recirculating system keeps the temperature equalized. This makes it possible to calculate the expansion or contraction factors of the tank, and the tightness of the tank is determined quickly. A leak of 0.05 gal. in one hour can be determined accurately. This test can cost between $1,000-$3,000 per tank. It is used only when there is an indication of a leak found in the daily inventory records. Such a test can be performed by the Mass. Petroleum Council.

It is recommended that improved control of underground gasoline and oil storage be implemented through the following actions:

STATE ACTION

1. It is recommended that the Fire Protection Regulations require the installation of only fiberglass tanks or fiberglass coated steel tanks for the bulk underground storage of gasoline (over 1,000 gal.) in all groundwater aquifer areas in the Commonwealth (or statewide if aquifer area approach too complex).

2. It is recommended that the State Building Code prohibit the underground storage of home heating oil tanks unless they are made of fiberglass or are coated with fiberglass.

3. It is recommended that Rule 51 of the Fire Prevention Regulations require the annual or semi-annual inspection of all inventory records by the local fire department or its designee.

REGIONAL ACTION

1. CCPEDC should assist fire departments in educating individuals who store oil and gasoline underground to the importance of keeping accurate inventory records from both a safety and water quality perspective.

2. CCPEDC should encourage local fire departments to carry out a regular inspection program of inventory records.

3. CCPEDC should locate and map all existing underground bulk storage tanks as potential sources of non-point source pollution, particularly in the recharge areas of municipal wells and Private Well Protection Areas.

4. CCPEDC should encourage towns to adopt the following recommendations for local actions.

LOCAL ACTION

1. Fire department personnel should carry out annual or semi-annual inspections of inventory records kept in conformance with Rule 51 of the Fire Protection Regulations. If the fire department has limited personnel, it may wish to designate the board of health for this function (the board of health would have to be willing to take on this added responsibility).

2. Towns should pass a town by-law that allows installation of only those underground gasoline or oil storage tanks that are fiberglass or are coated by fiberglass (for both commercial and domestic uses).

3. Towns should require permits for all gasoline or oil storage tanks, (both commercial and domestic).

4. Towns should pass a town by-law that requires the replacement of all steel tanks 15 years after the installation of the tank with fiberglass tanks unless the owner can prove through a Kent-Moore test that the tank is not leaking. However, only one-year extensions should be granted since such tanks could corrode at any point causing a serious leak. Most towns have kept records on the installation dates of each bulk storage tank through the licenses issued by the board of selectmen.

Salt Water Intrusion

Salt water intrusion is not, at the present time, a major water quality problem on Cape Cod. Only the Town of Provincetown has a significant intrusion problem in a public water supply well located in Truro (Knoll's Crossing). The potential for salt water intrusion becoming a problem in other public wells and in private wells, however, does exist and may be an increasing concern as the Cape's population grows.

As discussed in the draft plan, the USGS Comprehensive Study of Cape Cod's Groundwater will provide the information needed to avoid the problem of salt water intrusion in the future. The model will provide information on the location of the fresh/salt water interface, how water supply pumping affects the location of the interface and what future actions may do to the location of the interface. Actions of particular concern that could affect the fresh/salt water interface are discharging wastewater to the ocean and installation of major public water supply wells near the shore. In general, the effect of such actions would cause a localized intrusion problem.

The USGS computer model prepared as part of the USGS comprehensive study will be available in October, 1978. CCPEDC has successfully obtained a $6,000 increase in its budget to work with the USGS in FY 79 to utilize the results of the study to assist towns in analyzing specific water supply-related problems. It is recommended that this cooperative arrangement between the USGS be continued (see "Water Supply Management" section for further discussion) and that any anticipated problems of salt water intrusion be further evaluated using the USGS model. In this way any proposed action that may cause such a problem can be assessed for its impact on the fresh/salt water interface. However, towns can generally avoid the potential problem of salt water intrusion by following the recommendations provided in the "Local Action" section that follows.

FEDERAL ACTION

USGS should continue its Cooperative Agreement with CCPEDC to fully utilize the results of its comprehensive study of the Cape's groundwater. Through this Cooperative Agreement the information of USGS can be made available to the towns and their water supply consultants.

STATE ACTION

1. DEQE's Water Supply Division should fully utilize the information provided by USGS in evaluating local requests for the installation or increased pumping capacity of public wells near the shore to avoid salt water intrusion.

REGIONAL ACTION

1. CCPEDC should seek continuing funds for a Cooperative Agreement with USGS. Under this agreement CCPEDC would continue to monitor USGS installed wells and cooperate with USGS in maintaining the computer model, provide technical assistance to towns and their consultants based on the information developed in the Comprehensive Study.

2. Further information and recommendations on the problem of salt water intrusion should be developed as part of the Regional Water Supply Management Plan recommended in the "Water Supply Management" section of the final plan.

LOCAL ACTION

1. Towns should preferably dispose of all wastewater on land, as discussed in the "Sewer Construction" section of the final plan, to maintain recharge and avoid potential salt water intrusion.

2. In the development of future water supply wells, towns should utilize locations within the "Potential Water Supply Development Areas" outlined on Map 5.6 to avoid salt water intrusion. Even within these areas, which are all at least 10' above sea level, certain locations near the shore may still cause salt water intrusion depending on the wells' pumping capacities.

3. Any public well that is to be installed near the shore should be analyzed by the USGS for its potential to cause salt water intrusion. The town's water department should request of CCPEDC that such an evaluation be conducted in cooperation with the town's consultant.

Vessel Discharges

Vessel discharges came under the jurisdiction of EPA in 1972, when the first regulations for "marine sanitation devices" were issued. These regulations prohibited overboard discharge of sewage into the navigable waters of the United States under the authority of the Water Pollution Control Act (Section 13). This was not implemented, primarily because of the lack of available pump-out facilities.

Revised regulations were issued in January 1976, incorporating the 1972 amendments to the Water Pollution Control Act. The amendments authorized the Administrator to designate certain waters as no-discharge waters. Waters not so designated were considered to be treated effluent waters. On Cape Cod, all of the inland lakes and ponds are no-discharge areas, in which marine heads must be sealed at all times.

Federal guidelines have been issued establishing performance standards, and setting effluent discharge limitations for marine sanitation devices. These regulations, which were summarized in the draft plan are enforced by the U.S. Coast Guard, which certifies units for conformance. A federal task force recently evaluated all available devices, and recommended the use of maceration-chlorination devices to meet these treatment requirements. These devices grind the sewage and add chlorine bleach as a disinfectant. Concern has been expressed over the reliability of this method since it depends upon the owners' ability and willingness to operate it properly. Even when operated satisfactorily, these devices may not control substantial degradation from congested harbor areas.

Total prohibition of discharges is the only absolutely reliable method of control. This can only be accomplished where there are adequate on-shore facilities. Chapter 91, Section 59B of the Massachusetts General Laws authorizes the Division of Water Pollution Control to require pump-out facilities and dock toilet facilities before issuing a license to a marina. The Division has not used this authority, however, because it is considered that federal regulations supercede it. Under the federal regulations a state may apply for no-discharge status for areas used for swimming, shellfishing and fish spawning. In order to do so, the state must demonstrate to the EPA that adequate on-shore pump- out facilities are available and that complete prohibition is necessary.

Data recently obtained by the Division of Water Pollution Control indicate that numerous harbors were actually SB or SC in the summer of 1976. These data and shellfish testing results from the DEQE should be used to evaluate the causes of existing harbor problems to the extend possible. In some cases problems appear so serious that corrective measures should be instituted immediately. It is apparent, however, that considerable time will pass before the effectiveness of enforcing the new EPA guidelines can be evaluated.

The following actions are, therefore, recommended:

FEDERAL ACTION

1. The U.S. Coast Guard should provide adequate manpower to implement Marine Sanitation Devices regulations on Cape Cod.

STATE ACTION

1. DWPC should work with DEQE to utilize all available data to analyze the degree to which vessel wastes are the cause of segment pollution problems.

2. DWPC should consider using its authority to require the construction of pumpout facilities where vessel wastes are determined to be a serious problem.

3. DWPC should require all 201 facilities plans to address the problem of vessel wastes and recommend construction of appropriate facilities as part of the 201 facilities plan.

4. CZM should coordinate with DEQE and DWPC in analysis of available data to determine what areas should be recommended, to the EPA administrator as no-discharge waters and should work with EPA, DWPC and marina owners in implementation of this recommendation as necessary.

REGIONAL ACTION

1. The CCPEDC should work with the towns in developing and utilizing local authorities for control of boating wastes, including:

--board of health regulations

--harbormaster regulations (Ch. 102, Section 21-27)

--zoning bylaws (Chapter 808) controlling water uses

--motorboat laws (Chapter 90B, Section 15)

2. Barnstable County Health Department should continue to investigate complaints of shellfish contamination and public health threats posed to swimmers due to vessel discharges, at the request of local boards of health.

LOCAL ACTION

1. Towns should work with CZM, DWPC, DEQE and Barnstable County Health Department in investigating sources of coastal water contamination and take appropriate actions to close swimming areas and/or prohibit discharges through the mechanisms described under "regional action."

Environmental Impacts
Non-point Source Controls

(See draft plan for explanation of environmental assessment process.)

ENVIRONMENTAL IMPACTS	RECOMMENDATIONS: ROAD SALT APPLICATION & STORAGE			SANITARY LANDFILLS				STORMWATER RUNOFF						OIL & GASOLINE STORAGE			VESSEL DISCHARGE			
	Reduce use of road salts in public & private water supply areas	Store road salt in storage		Strictly enforce state regulations	Regionalize solid waste disposal	Encourage recycling	Monitor landfills	Establish BMP's and enforce through General Permit Program for storm drains	Minimize use of storm drains by increasing surface infiltration	Require erosion control plan	Limit impervious areas	Control erosion & require reclamation of sand & gravel pits	Encourage use of agricultural BMP's	Maintain inventory records of stored gasoline & oil	Require use of underground fiberglass storage tanks	SALT WATER INTRUSION	Use USGS model to avoid actions that may cause intrusion		Control boat occupancy in harbors	Provide pumpout facilities	Recommend no discharge areas
Biology/Ecology	B	B		B	A	B	C	B	B	B	B	B	B	C	A		B		B	B	B
Land																					
-Environmentally sensitive areas	B	B		B	A	C	C	B	B	B	B	B	B	C	A		B		B	B	B
-Historical, archaeological sites	C	C		C	C	C	C	C	C	B	C	C	C	C	C		C		C	C	C
-Open space, wetlands, forest	C	C		B	B	C	C	B	C	B	B	B	C	C	C		C		C	C	C
-Soil erosion	C	C		B	B	C	C	C	C	A	C	A	A	C	C		C		C	C	C
Water Quality																					
-Coastal	C	C		B	B	B	C	B	B	B	B	C	B	C	A		B		B	B	B
-Ground & Surface	B	B		B	B	B	C	B	B	B	B	B	B	C	A		C		C	C	C
Water Quantity																					
-Groundwater balance	C	C		C	C	C	C	C	B	B	B	B	B	C	C		C		C	C	C
Air Quality	C	C		B	B	C	C	C	C	C	C	C	C	C	C		C		C	C	C
Energy conservation	C	C		C	B	B	C	C	C	C	C	C	C	C	C		C		C	C	C
ECONOMIC IMPACTS																					
Increase in job opportunities	C	C		C	B	C	C	C	C	C	C	C	C	C	C		C		C	B	C
Reduced unemployment	C	C		C	B	C	C	C	C	C	C	C	C	C	C		C		C	B	C
Economic diversification	C	C		C	C	C	C	C	C	C	C	C	C	C	C		C		C	C	C
Property value increase																					
-Developed property	C	C		C	C	C	C	C	C	C	C	C	C	C	C		C		C	C	C
-Undeveloped land	C	C		C	B	C	C	C	C	C	C	C	C	C	C		C		C	C	C
Minimized service costs	C	C		C	D	B	C	D	C	C	C	C	C	C	C		B		C	D	C
Minimized public share of costs	C	C		C	D	B	C	D	C	C	C	C	C	C	C		B		C	D	C

For impacts that are physically or qualitatively measurable: A - Very beneficial impact relative to baseline; B - Beneficial; C - No difference from baseline; D - Adverse; E - Very Adverse

ENVIRONMENTAL IMPACTS:
NON-POINT SOURCE CONTROLS
(cont.)

	ROAD SALT APPLICATION & STORAGE			SANITARY LANDFILLS				STORMWATER RUNOFF						OIL & GASOLINE STORAGE		SALT WATER INTRUSION	VESSEL DISCHARGES		
	Reduce use of road salts in public & private water supply areas	Store road salt in storage sheds		Strictly enforce state regulations	Regionalize solid waste disposal	Encourage recycling	Monitor landfills	Establish BMP's and enforce through General Permit Program for storm drains	Minimize use of storm drains by increasing surface infiltration	Require erosion control plan	Limit impervious areas	Control erosion & require reclamation of sand & gravel pits	Encourage use of agricultural BMP's	Maintain inventory records of stored gasoline & oil	Require use of underground fiberglass storage tanks	Use USGS model to avoid actions that may cause intrusion	Control boat occupancy in harbors	Provide pumpout facilities	Recommend no discharge areas
SOCIAL IMPACTS																			
Land Use	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Growth rate	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Saturation population	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
-Focusing	0	0		1	2	1	0	0	0	1	2	2	0	0	0	0	1	1	0
Housing availability	0	0		0	1	0	0	0	0	1	1	1	1	0	1	0	1	0	1
Community character	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restrictions on property use	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Local autonomy	2	0		0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Transportation																			
OTHER CONSIDERATIONS																			
Political/Institutional																			
-Institutional feasibility	+	+		+	-	+	+	+	+	+	+	+	+	+	+	+	-	-	+
-Public acceptability	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-Public accountability	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-Efficiency/economy of scale	-	+		+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+
Technical																			
-Availability of technology	+	+		+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
-Ease of implementation	-	+		-	-	-	-	+	+	+	+	+	+	+	+	+	-	-	-
-Effectiveness	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Consistency																			
-CMZ Plan consistency	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-OSP Policies consistency	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-SENE Plan consistency	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Social impacts are evaluated by magnitude of change:

0 - No Impact; 1 - Slight Impact; 2 - Moderate;
3 - Major Impact

Other considerations are evaluated as either positive or negative:

++ Very Positive
+ Positive
- Negative
-- Very Negative

Water Conservation

Cape Cod is underlain by a vast groundwater resource, which has long been believed to be capable of providing the area with an unlimited supply of clean fresh water. In fact, most municipal water departments have found the area to have tremendous potential for wellfield development and have provided local residents with high quality water at relatively low cost.

Water conservation measures and water use bans have been necessary on Cape Cod only under unusual circumstances. Occasional water shortages have been experienced when delivery systems were unable to meet peak demands during drought periods. In isolated cases the development of water delivery systems has not kept pace with construction, and restrictions on the rate of development have been necessary. The only water shortage due to limitations of the groundwater resource rather than the delivery system has occurred in Provincetown. As discussed in the "Water Supply" section, this area has the most shallow and fragile aquifer on the Cape.

Cape Codders cannot take the continued abundance of clean fresh water for granted, however. The groundwater resource must be carefully managed to avoid adverse environmental impacts of groundwater withdrawal, including saltwater intrusion and pond level lowering. Essentially, all used water must be returned to the aquifer, and large watershed areas around public supply wells must be protected to maintain drinking water quality. The cost-effectiveness of water management can be greatly increased by reduced water use. Water conservation is, therefore, an important element of a water supply management program for Cape Cod.

Water conservation affords both economic and environmental benefits. Reduced per capita water use will result in the sharing of fixed capital, operation and maintenance costs by a larger number of users. The cost of public water to each user will, therefore, be reduced. Water users will realize additional cost savings in the form of energy saving. Heating water for showering, dishwashing and clothes washing is a major household energy use which can be substantially reduced through the use of water conservation fixtures.

Water conservation can help to improve groundwater quality and avoid septic system failure. A reduced flow through the septic system provides for longer wastewater retention in the septic tank. This allows greater time for bacterial digestion of wastes, producing an improved quality of effluent flowing into the leach facility. Lower wastewater flow helps to extend the life of the leach facility by slowing the process of leach field clogging due to continual wetness. Finally, reduced hydraulic loading can help avoid septic system failures in areas with marginal soils. Draft Chapter 4 recommends that water conservation be implemented in all problem areas as part of an abatement program.

Environmental impacts resulting from heavy municipal pumping could be directly reduced by water conservation. As discussed in the Environmental Impact Assessment section of draft Chapter 4, public water supply wells create cone-shaped depressions of the water table, with the lowest

point at the well site. A pond located near the well could experience water level lowering which could be destructive of its recreational and aesthetic values. If the cone of depression extends to the shore the well could become contaminated with salt. These impacts can become most severe as a result of increases in both population and water use during the summer, when there is negligible recharge of the water table by precipitation. For these reasons, water conservation can have particularly beneficial impacts during the summer months.

Reduced water use can also help avoid creation of sewer needs. Wherever wastewater is discharged to the ground, the water table is raised, or mounded. High density housing, particularly in areas with poor soils or high water table could cause mounding to the point that septic systems become flooded. This would threaten water quality as well as public health. A reduction in water use could mean the difference in such an area between continued use of on-site systems or construction of costly sewer collection and treatment systems.

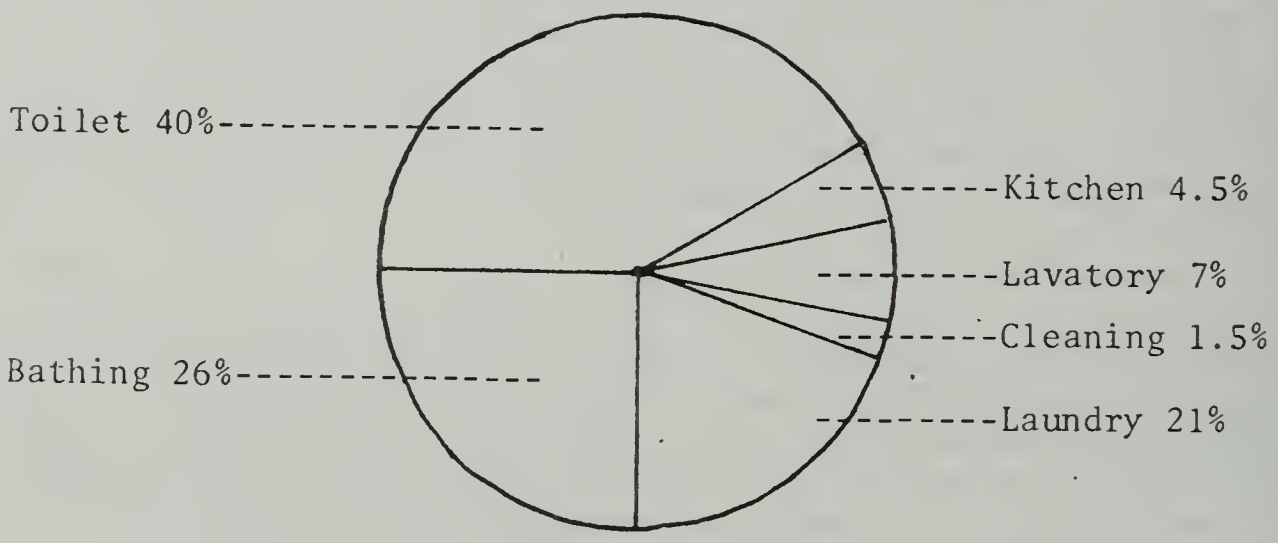
Finally, lower per capita water use will result in smaller watershed area needs for a given population. This lowers the cost of watershed protection through direct acquisition, and results in fewer restrictions on individuals' use of their property. The water quality benefits of water conservation must be discussed with caution, however. Calculations of allowable housing density within watershed areas described in draft Chapter 3 were based on an assumed water use to provide dilution. Should water use be substantially reduced, density figures will have to be lowered correspondingly. Fewer houses per 40,000 will be allowable, in order to maintain the same nitrate loading rate.

Water Use

The major use of water on Cape Cod is for indoor and outdoor domestic or residental uses. Indoor uses include drinking water, bathing, dish-washing, laundry and toilet flushing, and outdoor uses include car washing, filling swimming pools and watering gardens and lawns. Indoor domestic uses are broken down as illustrated in Figure 2.2.

FIGURE 2.2

INDOOR DOMESTIC WATER USE



Source: Massachusetts Water Supply Policy Statement (MWSPS), May 1978, p. 164.

While outdoor uses are a significant factor in overall domestic water use, they are difficult to quantify. The national average domestic indoor water use is 45-65 gpcd and the average per capita water use in eastern Massachusetts is 75 gpcd (MWSPS). In the Northeastern United States, the average outdoor use is between 10-100 gpcd. Cape Cod water departments and districts report per capita consumption rates that vary considerably. This variability in per capita consumption from one town to another is a common pattern throughout the state. (MWSPS)

A partial explanation for the difficulty in estimating per capita consumption on Cape Cod is the fluctuation in seasonal and year-round occupancy ratio. A straight division of water use by number of users would not be possible unless hotel and guest occupancy are known.

Reducing Domestic Water Use

Since domestic water use is the major water use on the Cape, it is here that major water conservation activities should be directed. Since toilet flushing and bathing are the most significant water consuming activities in a household, increased efficiency in toilet and bathing fixtures can have an important impact on overall home water use. In addition, "luxury" water consumption uses such as swimming pools and garbage disposals, or above average lawn watering can also be significant water consuming uses. There are a number of simple and inexpensive mechanical devices that can reduce residential water use substantially.

TABLE 2.8

WATER SAVING DEVICES COSTS & SAVINGS

DEVICE	COST	WATER USE	POTENTIAL WATER SAVINGS
Toilet			
Regular	$ 60.+	5-6 gal/flush	--
Water Saver	60.+	2.5-5 gal/flush	30-50%
Displacement Plastic Bottles, etc.	.50-$10.+	4.5-5.5 gal/flush	8-10%
"Dams"	$3.-$6.	3.5 gal/flush	25-30%
Retro Fitting Tank	$75.	2-2.5gal/flush	66-75%
Showerheads			
Regular	$5.-$25.	3-8 (15) gpm	--
Low Flow	$4.-$15.	2.5 gpm	65-75%
Inserts	$.50-$1.50	2.5 gpm	50%
Flow Restrictive Sink Aerators	$1.-$2.00	2.8 gpm	40-50%
Meter	$150-$500+ O & M		20-30%

Source: Massachusetts Conference on Water Conservation Proceedings, EOEA, June 1977. Updated by New Resource Group, 1978.

Water saving devices can be installed on existing toilets, showerheads and faucets or the homeowner can purchase new water saving models to replace old fixtures. Certainly, water saving fixtures should be used in all new construction. These devices can not only reduce water bills, but also, in the case of flow reduction showerheads, can produce substantial energy savings by reducing the need for hot water. Water and energy savings usually repay installation costs very quickly. See Table 2.8 for the costs and water savings of these devices.

In addition to utilizing mechanical water saving devices, homeowners can modify wasteful water use habits in their everyday activities. A list of these water saving activities is included in the section "Homeowner Actions." While these activity changes are not as easily measurable, substantial water savings can be accomplished with only minimal homeowner effort.

While domestic water use is the major concern on the Cape, there are numerous commercial uses, particularly in the summer months, that place considerable demands on local water utilities. Motels, hotels, restaurants, laundromats and car washes are heavy water users. For hotels and motels substantial water savings can be realized by installing the same water saving devices suggested for the individual home. Local chambers of commerce may be able to purchase these fixtures for their members at bulk rates. For those motels and hotels that are connected to a sewerage system savings will be doubled as sewer user fees are based on water use. High energy costs for frequent guest showers can also be substantially reduced.

Restaurants should install water saving toilets. While retrofitting in a single family home may not be cost effective in the short-term, it could be cost effective in heavily used rest rooms. Restaurants can also reduce water consumption by only serving water at the customer's request. A number of Cape Cod restaurants are currently following this policy. Water is saved not only in that many customers do not drink the water served, but more important, many gallons are saved in not having to wash the unused water glasses.

Generally, the use of laundromats is not actually an increase in water use since the users would be doing the same amount of laundry at home. Laundromats only centralize this use. However, in the summer, thousands of visitors increase laundromat use enormously. Often this increased use requires daily cesspool pumping resulting in very high septage flows. While there does not appear to be any simple solution to this problem, towns could require all new laundromats or existing laundromats replacing old machines, to utilize water-saving washing machines (usually front-loading models).

Car washes generally use greater amounts of water per car, from 60-80 gallons, than is used for this purpose at home. There are systems that recycle and filter the water used reducing the per car use to 6-8 gallons. The operator saves money by reducing the use of water and energy. Towns could require recycling of water in any new car wash established in the town. (OCPC, 1977)

At the present time, there are no large industrial water users on Cape Cod. It has been the policy of the CCPEDC in its economic development activities that it would encourage the development of non-

polluting industries that do not require large amounts of water for their operation. (Regional Growth Policy Statement, 1976). This policy is consistent with the findings of the 208 planning program. It is also recommended that towns do not attempt to attract heavy water using industries.

Water Utility Role

Another important approach to reducing water use, is the installation of water meters for all service hookups to a water supply utility. All Cape water departments, districts and companies should have a policy of 100% metering of all services. Metering can provide the water utility with valuable information on water use to assess the need for modifying rate structures to charge heavy users. Metering the many commercial establishments, particularly motels and restaurants, that are known to use high volumes of water in the summer months, may be of particular value.

Water utilities should also consider modifying their rate schedule. At the present time some utilities have a decreasing block rate schedule, the more water used, the cheaper per unit rate. Thus, small users are, in effect, subsidizing the large users. In metered areas, it has been shown that increased rates alone can substantially reduce lawn and garden watering. However, since the cost of water is low as compared to other utility costs and most rate increases are relatively small, increases can not be expected to effect any major reduction in domestic water consumption. However, it appears that a policy of increasing block rates can somewhat reduce residential water consumption and can substantially reduce industrial/commercial demands.

The problems of developing an equitable rate schedule for Cape Cod are beyond the realm of this study. In many areas, water rates are based on changes in seasonal use. In some cases, rates are based on winter water use by customer. In other cases, a summer surcharge is applied to all users. Where so many dwellings are unoccupied during the winter, a seasonal approach based on winter use would seem infeasible. Seasonal rates, however, do have merit and further examination of this problem in cooperation with the Cape's water utilities is needed.

A further water saving activity that can be carried out by water utilities is a leak detection program. Even the most leak-proof system loses approximately 6% (Mass. Conference) and some lose 20-40% from the distribution system. Obviously, such losses are very costly and wasteful. Equipment is available to detect leaks. A leak detection program must be coordinated with a repair and maintenance effort to be effective on a long-term basis. Such a program is cost-effective and can pay for itself in water saved.

Regulatory Approaches

A comprehensive water conservation effort can be aided by the town or water department (when appropriate) adopting certain regulations. Such regulations include requiring that a certain percent of total lot area remain in natural vegetation, allowing lawn watering only at certain times of the day, requiring major water users such as golf courses or schools to have a private water supply for all watering and irrigation purposes. Regulations requiring the use of water-saving devices in new residential and commercial construction could also be adopted.

Public Education

Public education is a critical element of a comprehensive water conservation program. In recent years, the Association for the Preservation of Cape Cod and New Resource Group have carried out a water conservation education program that has included slide shows, displays and distributing water conservation information to interested groups and citizens. While these private groups have done an admirable job in bringing water conservation information to Cape Cod residents, public education efforts should also be carried out at the state and federal levels and locally by water departments and districts.

The state and the federal government have the resources to prepare educational materials, and television spots that could be helpful in widely publicizing the need for water conservation. While water departments and districts have limited budgets, they can play a strong local role in public education. By mailing water conservation information with water bills, water commissioners and superintendents speaking to community groups and at schools, water utilities can focus attention on local water needs and the importance of water conservation.

It is the conclusion of the 208 Program that water conservation must be an integral part of an effective water resource management program. The following recommendations are designed to effect a long-term conservation effort on Cape Cod.

FEDERAL ACTION

The Environmental Protection Agency should conduct a public education program to raise public awareness of the need for water conservation. Media coverage should be obtained nationally, public education films and publications should be available to interested citizens and groups.

STATE ACTION

1. The Executive Office of Environmental Affairs and the Water Resources Commission should also engage in public education efforts, recognized as essential to a successful water conservation effort in the Massachusetts Water Supply Policy Statement.

2. The State Building Commission should require through the State Building Code, that all new construction or replacement of plumbing fixtures employ water-saving fixtures. The EOEA and Water Resources Commission should take an active role in encouraging these changes. (The State Building Code presently requires the use of a low flow showerhead--3 gpm--for energy saving purposes.)

3. The Water Resources Commission should conduct a study of water supply pricing by both public and private water utilities to possibly result in legislation on water pricing. Such a study would assist water utilities in adopting equitable pricing arrangements, protect water users, help form the foundation of sound financial management of water utilities, and potentially encourage water conservation.

4. Changes in the State Environmental Code should include provisions for encouraging water-saving devices. Title 5 presently allows composting toilets with the approval of the local board of health but requires the burial of the compost material resulting from the system. DEQE will soon conduct a demonstration program examining a number of compost toilets and greywater systems. The program will evaluate how the systems function and whether pathogens remain in the compost material. It is hoped that the results of this study will provide the necessary guidance to further modify the environmental code to encourage the use of these water-saving devices.

5. The discharge of over 1 million gallons of fresh water per day by the State Fish Hatchery in Sandwich is not consistent with the State's water conservation policies. It is recommended that the State Division of Fisheries and Wildlife should institute a means of recycling and reusing this water to eliminate this discharge.

REGIONAL ACTION

1. CCPEDC should support the efforts of the conservation groups and assist local water utilities in educating the public to the need for water conservation.

2. CCPEDC should assist towns in seeking funds to carry out a community-wide water conservation effort that may include purchase and distribution of water saving devices and public education.

3. CCPEDC should assist water utilities in examining present rate schedules as part of regional and local water supply planning activities.

4. CCPEDC should continue its policy of encouraging only those industries that are not large water consumers to locate on Cape Cod.

LOCAL ACTION

1. All municipal buildings, including schools should utilize water-saving devices. While the town, in many instances, does not actually pay water bills for these buildings, considerable water savings could be gained by installing low flow showerheads and modifying toilets to reduce flow. Energy savings afforded by the low flow showerheads in schools would pay for the fixtures in a very short time.

2. The towns should adopt bylaws that require water-saving devices to be installed in all new construction (residential, commercial, industrial) to be enforced by the town building inspector. Such a model regulation is presented in Appendix E which was adopted as part of the Plumbing Code of Fairfax County, Virginia.

3. The towns should require that all new laundromats and existing laundromats replacing old machines, use water saving washing machines (through town bylaw regulation approved by DEQE).

4. The townsshould require any new car wash to use a recycling system (through town bylaw).

WATER UTILITY ACTION

1. All water utilities should require 100% metering of all services and should have a program to upgrade meters to assure accuracy.

2. During the summer months, water utilities should require all users to minimize lawn watering.

3. Water utilities should consider requiring large users of non-potable water for lawns such as school playing fields and golf courses to have private wells to recycle water on-site. This would help recapture the nitrate from fertilizers used on the site and reduce public water supply demands and watershed protection needs.

4. Water utilities should keep accurate records of water use by category of user--residential, commercial and industrial.

5. Water utilities should examine water use patterns and present rate schedule to determine whether restructuring of the rate schedule is needed.

6. Water utilities should conduct a regular leak detection program as part of their long-term repair and maintenance activities.

7. Water utilities should work to become the focal point for water conservation activities in their town. Information materials on water conservation should be made available to interested citizens and groups. Water utility personnel and commissioners should speak to local community and school groups and the media to raise public awareness of the need to conserve local water resources.

8. Water utilities should consider encouraging or requiring homeowners and motel owners with swimming pools to fill their pools prior to the peak water use period.

BUSINESS ACTION

1. All businesses, commercial and industrial, should make a concerted effort to reduce water consumption by the use of water-saving devices, by recycling when possible and by conducting a "water audit" to determine where in the firm's operations, water could be conserved. The New Resource Group will conduct such an audit free of charge and assist the business in determining an appropriate water conservation program. With the large number of motels on the Cape which are heavy summer users, it is suggested that the Cape Cod Chamber of Commerce and local Chambers make a special effort to encourage motel owners to install water-saving showerheads and to modify toilets to conserve water in each motel unit.

2. All restaurants on Cape Cod should serve water only at the customers request. It is recommended that the Cape Cod Chamber of Commerce make available, as a public service, table cards that state the restaurants water conservation policy and the importance of conserving the Cape's water resources.

3. Builders and contractors should utilize low flow showerheads (already required by State Building Code), low flow toilets and faucets in new construction. These fixtures generally cost no more than regular models and can be a selling point to many conservation minded buyers.

HOMEOWNER ACTION

1. Individuals building new homes should install water-saving devices. Homeowners should install low-flow showerheads and fixtures and modify toilets to reduce flow. If any fixtures must be replaced, new water conservation models should be used. Water conservation not only saves in water, and heating bills, but if a home has a septic system, water conservation can help prolong the life of the system, particularly in problem areas.

2. For individuals who are experiencing problems with their on-site disposal system, a composting or other innovative system may help to solve this problem and afford considerable water savings. A composting system requires no water and, therefore, can conserve up to 40% of the average household water use. These systems discussed on page 4-28 of the draft plan still require the use of a greywater system and, to be approved for new construction, the lot must be able to accommodate a conventional system.

3. All plumbing leaks should be fixed promptly. A continual leak can waste more than a 100 g/d.*

4. Machine washing of dishes or clothing should be done with a full load. Water conservation clothes washers are available.*

5. Avoid running tap water for washing dishes, cleaning fruits and vegetables, brushing teeth.*

6. Keep a container of water in the refrigerator for drinking to avoid running tap for cold water.*

7. Wash the car using a bucket of water rather than keeping the hose running. Only use the hose for final rinsing.*

8. Water gardens and lawns in early morning to reduce evaporation and, thus, increase the amount of water that reaches plant roots. Watering during the day can also burn the lawn because the water drops magnify the sun's intensity.*

9. Leave grass about 2" high to hold dew; this will also shade roots better than a closely cut lawn. Heavily mulching a garden also prevents soil drying. Both of these suggestions help reduce the need for watering.*

10. Minimize lawn area, retaining as much natural vegetation as possible. Not only does this minimize the need to water grass but greatly reduces the amount of fertilizer needed and helps to maintain the character of Cape Cod.*

11. Use native plants and shrubs that do not need more than natural rainfall to thrive. Nursery and garden suppliers can provide information on native varieties.*

*EPA, 1977.

Management Agencies

The 208 final plan is required by PL 92-500 to recommend to the Governor of the Commonwealth the designation of an agency or agencies to implement all elements of the recommended plan. Most of the comments on Chapter 6 of the draft plan, "Areawide Management Structure" indicate general agreement with the management program presented. This management structure would rely primarily on designating existing local authorities to implement recommendations in the areas of land use, structural facilities planning, construction and operation and non-point sources of pollution. The CCPEDC would be designated to carry out regional planning, program development and coordination, and to coordinate water quality monitoring, testing and analysis. The management program outlined in the draft plan also calls for further investigation into the possibility of strengthening the regional role in those areas now under the authority of the towns.

Throughout the planning program there has been considerable public support for increasing regional authority for water quality management. As anticipated, a number of those commenting on the draft plan, both individuals and plan review committees, indicated support for a stronger regional role in a number of program areas, particularly facilities planning, construction and operation.

It is clear that the potential for increasing regional authority over wastewater management on Cape Cod needs further attention. It is recommended that the CCPEDC create a Water Resources Advisory Council to advise the Commission on conducting its responsibilities under the 208 final plan and in considering the expansion of its role, or the role of another regional agency(ies), in the continuing water quality management program.

Water Resources Advisory Council

It is recommended to the CCPEDC that the Water Resources Advisory Council be composed of a member from each Cape Cod town and representatives of Cape-wide organizations listed in the "Public Participation" section of the final plan. Members from appropriate regional, state and federal agencies, also listed in the "Public Participation" section, would be asked to serve as advisory members of the council. Town members would be members of the local water quality advisory committees(discussion follows) who would serve as a liaison between the continuing regional program and local efforts to implement the plan recommendations.

The CCPEDC would charge the Advisory Council to fulfill the following responsibilities:

1. To assist the staff in maintaining contact with local boards through the local water quality advisory committees and with represented organizations.

2. To review and comment on all 208 staff prepared reports including the annual update of the 208 plan.

3. To review and make recommendations on local requests to use the USGS groundwater model through the continuing cooperative agreement between USGS and CCPEDC.

4. To review all related local and regional applications for federal funds (such as 201 facility planning grants) for 208 plan consistency and to advise the CCPEDC on applications under the A-95 review process.

5. To support and encourage the implementation of the 208 plan recommendations.

6. To provide the 208 staff with local information needed for special planning projects and to update the 208 plan.

7. To serve as a forum for resolution of water quality-related conflicts at the request of towns or CCPEDC.

8. To investigate possible means of strengthening or creating a stronger regional role in wastewater management on Cape Cod. Local support for such actions must be fully explored as well as the need for legislation to allow such regional authority. Advise the CCPEDC on findings and recommended actions.

9. To encourage broad public participation in the continuing 208 program by sponsoring public meetings, workshops and seminars.

The purpose of the Water Resources Advisory Council is to maintain the valuable mechanism of public participation provided by the 208 APAC. The 208 plan is not a static document but must be changed and updated to meet new needs and demands. The invaluable contribution of citizens in formulating this final plan must continue to be an essential element in the 208 program. Through the Water Resources Advisory Council, this vital link with local boards and interested citizen groups can keep the 208 plan a dynamic and meaningful tool for guiding water quality management efforts in the coming years.

Local Water Quality Advisory Committees

Intra-town coordination of boards, departments and committees involved in water quality-related activities is essential to the implementation of the 208 plan. The desirability of creating inter-departmental water quality committees was demonstrated by the activities of the local 208 review committees. It has become apparent that lack of such coordination has been a major impediment to the development of publicly-acceptable 201 facilities plans for Cape Cod communities.

It is recommended that each town create a water quality advisory committee, by town meeting vote, comprised of a representative of each of the following boards and departments (where applicable):

--board of selectmen
--board of health
--planning board

--conservation commission
--water commission
--sewer commission
--highway or engineering department
--department of public works

One of the members of the committee should serve as the representative to Water Resources Advisory Council. The responsibilities of the committee would be as follows:

1. Serve as the local contact for CCPEDC in water quality planning issues.

2. Coordinate local efforts to implement 208 recommendations.

3. Meet at least once annually to review the 208 plan and make recommendations for revisions.

4. Cooperate with CCPEDC in continuing 208 planning efforts and implementation projects.

5. Participate in town 201 planning projects and make recommendations to the Water Resources Advisory Council on 201 plans being reviewed for consistency with the 208 plan.

Management Functions

To develop an effective areawide wastewater/water quality management program certain basic functions must be performed. These basic functions and the agencies designated by the 208 plan to perform these functions are as follows:

Planning, Program Development and Coordination

It is recommended that CCPEDC establish a water quality planning staff which can continue the 208 areawide water quality management program (financial arrangements for this program are discussed later in this section). To advise the CCPEDC in managing the continuing 208 program, it is recommended that CCPEDC establish a Water Resources Advisory Council (described above). Staff activities to be carried out under this function include:

Updating 208 Plan - Annual updates of the 208 plan are required by PL 92-500. The Water Resources Advisory Council will assist the staff in preparing the update, will review and comment on the update and advise CCPEDC on its acceptability. For federal grant eligibility, treatment facility proposals must be consistent with the 208 plan, so that revisions to the plan can be very significant to the towns.

Local Assistance - CCPEDC staff assistance has already been utilized by a number of towns and should be expanded as the program continues. The two proposals that have been accepted and funded by EPA for the first year of the continuing program are oriented to providing technical assistance to help towns implement the plan recommendations. Such technical assistance to towns can include drafting model regulations,

sharing technical data, conducting training sessions for local officials, coordinating the flow of information among towns and other levels of government, adapting the recommendations of the 208 plan to specific town problems, assisting in consultant negotiations, reviewing consultant reports and publishing information materials.

Advocacy - Another aspect of this function is that of advocacy for the Cape Cod perspective before state and federal agencies. Since state and federal agency authority will continue to exceed that of regional and local organizations, it is important to maintain lines of communication, which can be used to influence other levels of government to take actions which are supportive of Cape Cod's water quality goals and needs. Such advocacy can be accomplished by staff working with other agency staff or through formal channels directly with the agency involved or through the Cape's delegation to the General Court.

Research - While research funds are limited, this function would involve the staff seeking funds to have research conducted into such areas as improving septic systems and demonstrating innovative wastewater management techniques. It also involves keeping up to date on new research findings and relating these findings to Cape Cod problems.

Coordination - Special projects, such as the development of the USGS ground water model, require coordination between Cape Cod towns and outside agencies. Regional planning efforts in the area of water quality and water resource management also require coordination between the Cape Cod towns. In addition, there is a need to coordinate both regional and local activities in such areas as economics, coastal zone management, natural resources, etc. with water quality concerns. These coordinative functions can best be performed at the regional level through the CCPEDC.

Monitoring, Testing and Analysis

The need for a comprehensive water quality monitoring program was discussed in the draft plan, Chapters 3 and 5. While a number of local, regional, state and federal agencies are presently conducting testing programs, no single agency has the resources to conduct all of the necessary monitoring functions. A key element in this management plan is the coordination of local, regional, state and federal agencies that are presently conducting testing programs and the determination of need for additional testing facilities.

Each of the following agencies conducts testing in Barnstable County:

Town Boards of Health - problem identification; sample collection (in some cases tests are performed by private engineering firms).

Barnstable County Health Department - bacteriological and chemical water analysis; public health surveillance.

Department of Environmental Quality Engineering:
- Division of Water Supply - public water supply, chemical analysis.
- Southeastern Regional Office - shellfish monitoring.
- Division of Water Pollution Control (DWPC) - coastal segments and effluent monitoring.
- Division of Fisheries - dissolved oxygen/temperature profiling in stocked trout ponds.

U. S. Geological Survey (USGS) - water table monitoring, zone of transition monitoring, special source studies, Otis sand filterbed study, sanitary landfill plume studies.

Development of a central data bank and periodic data analysis are two important coordinative functions which are not presently being performed. CCPEDC should assume these responsibilities as the designated areawide water quality planning agency. The CCPEDC should move to develop a comprehensive monitoring program and seek funding for necessary additional testing programs.

Structural Facilities Planning, Construction & Management

The major regional concern in structural facilities planning and management is the ensurance that local projects are consistent with the areawide plan. The Mass. Clean Waters Act states that "The Administrator shall not make any grant for construction of a publicly owned treatment works under section 201... except for works in conformity with such (areawide) plan." The following discussion describes the recommended legal-institutional mechanism of implementing this requirement in the Cape Cod region.

Several alternatives were considered in the development of the draft plan, ranging from direct regional authority to construct, operate and maintain sewerage systems to a regional role limited to technical assistance and coordination. The former was eliminated in the draft plan because of adverse public comment and the unlikelihood that such a major change requiring new legislation could be implemented in the forseeable future. Greater public interest was expressed in an option that would designate the county to receive 201 funds and contract with the towns to construct, operate and maintain facilities. This would virtually guarantee consistency with the 208 plan. It was concluded that for the immediate future town construction, operation and maintenance of treatment facilities with regional technical assistance and review of plans is preferable.

It is recommended in the "Sewer Construction Projects" section that the towns be designated as 201 agencies for the purpose of construction, operation and maintenance of single treatment systems. Water pollution abatement districts are also recommended for formation and future designation in Buzzards Bay and South Sagamore.

Consistency with the 208 plan is to be accomplished through inter-agency cooperation established in a memorandum of understanding between DWPC,

DEQE, EPA and CCPEDC. The main provision of the memorandum would be that the agencies agree to adopt the 208 policies in issuing grants, permits or orders pertaining to construction of treatment and disposal facilities and that they notify CCPEDC in advance of all actions taken in these areas. DWPC is designated as the lead agency for coordination with CCPEDC on 201 grants projects.

The CCPEDC, through its Water Resources Advisory Council, is to provide a determination of consistency between facilities plans and the areawide plan prior to final funding approval.

The towns are to coordinate with the regional Water Resources Advisory Council through local water quality advisory committees. The local committees are to make recommendations to the Council on revisions of the 208 plan and on 201 facilities plans being reviewed by the Council for consistency with the 208 plan. In the case of a town which fails to constitute a water quality advisory committee meeting the requirements of the 208 plan, the Water Resources Advisory Council is to assume the responsibility for plan revision and 201 facility plan approval.

The effectiveness of this management arrangement in assuring consistency with 208 plan is to be evaluated in the first five years, and if it is ineffective, stronger regional authority is to be considered.

Non-Point Source Management

Authority for the control of non-point sources of pollution is now distributed between a number of town boards and state agencies. While adequate authorities exist to implement the controls recommended by the 208 plan, these agencies need to dedicate considerably more effort and resources to the problem of non-point source pollution.

As discussed in sections of the "Non-point Source Controls" discussion, the Division of Water Pollution Control has regulatory authority over non-point sources under the Mass. Clean Water Act. Since DWPC is primarily concerned with controlling point sources with its limited staff, it has put little emphasis on non-point source controls. Certain other state agencies have authorities in controlling non-point sources that are presently not being exercised.

In addition, while certain regulatory approaches are also available to local boards including boards of selectmen, planning boards, boards of health and conservation commissions, these opportunities for improved control in this problem area have been largely overlooked. Specific responsibilities for improving non-point source control are assigned in the following section "Designated Management Agencies." It is also recommended that the local water quality advisory committees assume a coordinative function in insuring that local boards implement the 208 plan recommendations in non-point source control.

While there have been public comments during the planning program that a stronger regional role in non-point source management is needed,

such as establishing a regional health code, or regional authority for insuring local enforcement of Title 5 and the state sanitary landfill regulations, such authorities need further examination by the Water Resources Advisory Council.

Land Use Management

Land use management should continue to be primarily a local responsibility. With the increased information and technical resources provided by this 208 plan and regional planning staff, towns can continue to rely on their planning boards and conservation commissions as their land use management agencies. The proposed regional water quality planning staff should work closely with these local boards to help them adapt 208 land use proposals to specific town conditions. By utilizing these existing legal and institutional structures, the towns can take immediate action to implement the 208 land use management program. Again it is recommended that the local water quality advisory committee take a leadership role in activating appropriate local boards to implement the 208 recommendations.

While there have been occasional suggestions that a regional land use regulatory authority is needed, there seems to be very little support for such an authority even in water-related land use matters. Unless significant changes take place in public attitudes in this area, it is anticipated that regional responsibility will rest with providing technical assistance and encouraging local actions that are consistent with regional plans.

Designated Management Agencies

In accordance with the regulations for "Preparation of Water Quality Management Plans," 40 CFR, Part 131, the 208 areawide plan recommends the following designations of management agencies to carry out the recommendations of this plan:

Federal Agencies

Environmental Protection Agency

--provide 201 funding (in cooperation with CCPEDC and DWPC), supervise planning, construction and operation of structural facilities, in accordance with the 208 plan

--provide adequate funding for 208 plan implementation and continued planning

--conduct public education to encourage water supply and water quality protection

--encourage full implementation of RCRA by promulgating regulations and seeking additional funds for full implementation of the Act.

--encourage improved non-point source control by states by re-

quiring states to establish General Permit Programs when given NPDES responsibility

--continue funding research into non-point source control techniques

--adopt 208 funding policies, sewer service areas, and criteria for 201 projects.

--continue to utilize USGS in reviewing hydrologic impacts of proposed sewer facilities

USGS

--continue cooperative agreement with CCPEDC to:

--retain all water quality and quantity information in central location in cooperation with CCPEDC

--assist in establishing procedures for landfill and sewage treatment plant monitoring

--assist CCPEDC in regional water resource planning efforts

Soil Conservation Service (USDA)

--assist towns in developing criteria for erosion control plans and in reviewing erosion control plans submitted by developers

--assist in establishing best management practices for agriculture in cooperation with the Barnstable Conservation District and DWPC

State Agencies

Executive Office of Environmental Affairs

--insure consistency between 208 plan and state water resources policy and other related state environmental programs and regulations

--conduct public education programs, in cooperation with the Water Resources Commission, to encourage water supply and water quality protection

--investigate and encourage methods of reducing solid waste generation in the state through such approaches as a state bottle bill and requiring businesses to reduce packaging materials

--develop a septage treatment policy to guide towns and state agencies in facilities planning projects

--seek and appropriate adequate funds for DEQE to investigate problem areas and enforce Title 5 on Cape Cod.

Division of Water Pollution Control (DWPC)

--supervise construction and operation of structural facilities

--set 201 priority list in cooperation with CCPEDC

--cooperate with CCPEDC in evaluating condition of Cape Cod ponds

--establish state hazardous waste disposal facility

--investigate landfill leachate collection and treatment technologies

--establish and enforce a General Permit Program for storm drains; designate Cape Cod as a General Permit Program Area

--serve as lead agency in establishing and enforcing BMP's for agricultural activities and coordinate other agencies involved in agricultural management.

--adopt and implement 208 criteria for 201 studies

--give funding priorities to 208-recommended sewer facilities

--adopt 208 funding policies to ensure 201 funds provide the maximum incentive to towns to protect water quality and assure consistency with 208

--recommend to the Water Resources Commission formation of water pollution abatement districts in Buzzards Bay and South Sagamore

--assume responsibility for coordination with 208 on construction projects

--give priority to funding regional septage facilities

--reserve construction funds for non-sewered alternatives

Department of Environmental Quality Engineering (DEQE)

--enforce state landfill regulations and Title 5, seeking additional funding and staffing as required

--assist CCPEDC in reviewing innovative technologies and subsurface disposal options

--work with CCPEDC to develop comprehensive water quality/quantity monitoring program

--continue chemical testing and analysis of municipal water supplies

--establish state policy on acceptable septage treatment and disposal options

--assist CCPEDC in developing acceptable solid waste management plans.

--utilize USGS information and coordinate with CCPEDC in evaluating local requests for installation of new wells or increasing capacity of existing wells

--conduct study of Otis AFB to determine whether it should serve as a potential water supply development area or as a site for regional wastewater or solid waste management facilities

--issue regulations under Ch. 25, S. 7A to require construction of salt storage sheds or relocation of stockpiles to non-critical areas and enforce present authority to require annual reports from large users

--implement 208 recommendations and coordinate with 208 agency in granting permits for sewage and septage treatment.and disposal facilities

--support efforts to establish regional septage facilities through its regulatory powers

--require trained health agents for Title 5 enforcement

--review information in the 208 plan and make appropriate revisions to Title 5

--exercise authority to implement Title 5 in Category 1 areas

--investigate and recommend control of chemical septic tank scouring agents

Department of Public Safety

--seek modifications to Fire Protection Regulations to require underground installation of only fiberglass storage tanks in aquifer areas and to require local fire departments to conduct annual or semi-annual inspections of inventory records kept in compliance with Rule 51.

Mass. Department of Public Works

--continue efforts to minimize the impacts of road salt use through careful supervision of maintenance personnel, improved equipment, and research into improved application techniques; implement policy of storing all road salts in storage sheds, by constructing storage sheds for all MDPW stockpiles and assisting towns to construct storage sheds with funding and technical assistance

--conduct educational workshops for local highway maintenance personnel on application and storage procedures

Regional Agencies

Cape Cod Planning and Economic Development Commission (CCPEDC)

--establish a permanent water resources planning staff

--establish a Water Resources Advisory Council to advise CCPEDC in water quality planning policies and program development

--provide technical assistance to town boards and departments on facility planning, construction and operation, on-site system management, land use management and non-point source control.

--encourage the implementation of all final 208 plan recommendations by the towns and other responsible agencies

--update 208 plan, continue regional water quality planning

--develop regional water supply management

--coordinate regional septage and solid waste disposal planning

- coordinate regional water quality monitoring data in cooperation with DEQE, DWPC, USGS and the County Health Department; act as a clearinghouse for storage and regional evaluation of all water quality and quantity data obtained on Cape Cod

--review 201 proposals and plans for consistency with Cape Cod 208 plans and establish 201 funding priorities in cooperation with DWPC and EPA

--review and disseminate to the towns new information and research data on wastewater management and water quality

--coordinate special training programs for local health agents and other town officials on water resource protection matters

--inform and involve the public on matters and issues of importance to water quality and 208 plan implementation.

Barnstable County Health Department

--conduct private well sampling and perform bacteriological testing for municipal water supplies and continue recreational waters sampling program

--provide all water quality information to central data bank

Barnstable Conservation District

--cooperate with SCS in providing assistance to towns in erosion control and with DWPC, SCS and the University of Massachusetts Experimental Stations in setting BMP's for agricultural activities.

Local Boards

Boards of Selectmen

--supervise structural facilities planning, construction and management

--initiate 201 or other comprehensive planning process in towns that have identified "Potential Sewer Service Areas"

--participate in Regional Solid Waste Disposal Advisory Committee and the proposed Septage Task Force

--improve stormwater runoff control through such methods as reduced road salting, (may involve town DPW as well).

--cooperate with other town boards to adopt bylaws encouraging water conservation and underground storage of gasoline and oil in fiberglass tanks only.

Boards of Health

--establish program to monitor water quality in areas of sewer treatment plants and sanitary landfills (in cooperation with regional program)

--upgrade septage treatment and disposal

--control on-site disposal through strict enforcement of Title 5, implementation of on-site system management program, and adopt special health regulations as recommended

--upgrade sanitary landfills to meet state requirements, cooperate in regional solid waste planning and encourage recycling.

Planning Boards and Conservation Commissions

--identify "Water Resource Protection Areas" and seek zoning modifications to implement 208 land use recommendations

--encourage open space acquisition, conservation easements and transfer of development rights in protection areas

--update comprehensive town plans to include water quality and water resource considerations

--in cooperation with water districts or departments, determine future public water supply areas and recharge needs and adopt protective measures

--utilize zoning bylaws, subdivision regulations and state Wetlands Act to control non-point pollution sources such as erosion and sedimentation and storm water runoff from urban areas construction related activities, agricultural uses and from uses of fertilizer and pesticides

Water Quality Advisory Committee

--cooperate in regional water resource planning by participating in the proposed Water Resource Advisory Committee

--assure consistency of local 201 plans with 208 plans

Fire Departments

--control underground storage of gasoline and oil by strict enforcement of the Fire Protection Regulations

Financial Arrangements

Where the costs of specific recommendations can be estimated, they have been so noted in "Water Quality Management Recommendations," Chapter 2. Since town resources vary considerably, however, it is very difficult to determine the cost of implementing each 208 recommendation in each town. In addition, the implementation of the various 208 recommendations will require varying degrees of effort.

The additional work load to carry out certain recommendations may be assumed by town boards with little or no cost to the town (requiring developers to submit erosion control plans, using sand instead of road salt in municipal well recharge areas). For other recommendations, it is likely that some additional town personnel or expenditures will be needed at some point in the future (constructing a municipal salt storage shed, inspecting on-site systems in Category 1 & 2 problem areas). Certainly, the municipal share of building treatment facilities under a 201 facility plan is a significant financial commitment to protecting public health and water quality.

Where town funds are required, town meeting must provide the funds necessary to implement the recommendation. Where state or federal assistance is available to towns for a specific implementation action, CCPEDC will provide technical assistance to the towns in seeking that assistance.

Most recommendations to state and federal agencies have not been analyzed in terms of specific manpower or equipment needs. It is clear that such analysis can only be performed by the agencies in question, by evaluating the need for additional staff or by reordering agency priorities to accommodate the 208 recommendations. Where it is evident that additional funds would be needed for a specific recommendation, a recommendation has also been made that the state agency seek such funds from the General Court or that the federal agency seek funds from Congress. It should be evident that additional funds are needed on both levels of government to meet the goals of PL 92-500.

On the regional level financial arrangements can be more clearly outlined. To carry out the responsibilities of water resource planning, coordination of water quality monitoring efforts and technical assistance to towns the following staff needs are anticipated on a permanent basis:

CCPEDC		ANNUAL COST
water resources coordinator (administration, water supply planning, intergovernmental liaison, local assistance, grant review, coordination of public participation)		$16,500
technical associate (local technical assistance in engineering fields, grant review, model regulation writing, pilot field projects)		$16,000
research assistant (monitor USGS wells, assist in water quality sample collection, assist staff by data collection and inventory projects)		$10,000
secretary		$ 8,000
	Subtotal	$50,500
Other Expenses		
office space, utilities, supplies, travel, telephone, postage, etc.		$10,000
contract services (technical assistance from USGS, legal, consultants)		$10,000
	Subtotal	$20,000
	TOTAL	$70,500
Barnstable County Health Department		
chemist (conduct water quality testing of private wells)		$13,000
laboratory supplies		$ 1,000
	TOTAL	$14,000

Both CCPEDC and the County Health Department funds are included in the Barnstable County budget and any increase in personnel or other expenses must be approved first by the Barnstable County Finance Advisory Board and Barnstable County Commissioners. Even with such local approval, however, it remains up to the Committee on Counties and the General Court to approve county budgets. While it has been the present Governor's policy to veto any increases in county budgets, there may be a change in this policy under a new administration that will begin in January, 1979. There has also been increasing consideration by both the Governor's office and the General Court of the possibility of releasing county budgets from legislative control and giving fiscal autonomy to the counties.

It is also appears that a certain degree of financial support for the continuing 208 program may be available through EPA funds. It is likely that at least for the next one to two years, sufficient funds to support at least one staff position will be available from EPA. This funding provides 75% of the program cost and requires a 25% local match.

In the first year of the continuing program, FY 79, EPA is providing $40,000 to the Cape Cod 208 program. With the local CCPEDC match and a position provided through CETA, this funding will enable CCPEDC to carry on the 208 program at approximately the recommended level. CCPEDC was also successful in obtaining an addition of $6,000 to its FY 79 budget to support a Cooperative Agreement with the USGS which is included in the proposed budget under "contract services."

The combined funding for FY 79 will enable the 208 staff to initiate an intensive technical assistance program with the addition of a technical associate and to continue its regional planning activities. Future support from EPA is expected to be reduced to $25,000 or less per year, and the CETA position may no longer be available. For this reason, it is recommended that the CCPEDC seek the creation of at least the position of water resources coordinator as a county position in FY 80 to insure that water resources planning will be a permanent part of the CCPEDC's comprehensive planning program.

It is further recommended that CCPEDC consider requesting the creation of the research assistant position for FY 80. While this position is considered to be necessary to the continuing program, it is understood that politically the attempt to create two positions in one year may not be advisable.

It is also recommended that the CCPEDC continue to seek $6,000 in its annual budget to support the cooperative program with USGS discussed in detail in the "Water Supply Management" section of the final plan. CCPEDC should also evaluate the need for additional funds for the USGS/CCPEDC Cooperative Agreement as the program proceeds. Finally, it is recommended that the County Health Department again seek to create the county position of chemist and that the CCPEDC support this request.

Town/County Contracts

An alternative approach to providing the necessary financial support for the continuing 208 program other than relying on the county budget is through enabling legislation that would allow towns to contract with the county for services. At the present time the county does not have the authority to perform services under direct contract to the towns. However, precedent for the General Court granting this authority has been set in Franklin County. There towns wanted to have the county hire a regional health agent to be paid directly under contract with the towns that would use the agent's services.

The authority for town/county contracts has many possibilities. Towns interested in pursuing a special program could get together and hire a regional staff person who could cost-effectively handle the work for the involved towns. The time of the staff person to be spent in each town could be estimated and the person's salary divided among the co-operating towns accordingly. Each town would appropriate their share of the individual's salary at town meeting.

Through town/county contracts, the funding for locally supported programs could be provided without the approval of the General Court. Each town would have direct control over whether or not it wanted to participate in a special project. There would be enormous flexibility in the types of projects that could be conducted and staff with expertise suited for each project could be hired specifically to carry out that project.

Town/county contracts are suited particularly to the many planning activities of CCPEDC. When certain towns want specific problems solved, they may approach the CCPEDC for assistance. Unless the problem is Cape-wide in nature, it is unlikely that CCPEDC will allocate major staff time to the project. While local technical assistance to a single town or a group of towns is a major emphasis of CCPEDC, its staff is limited and cannot always get involved in a local project to the extent needed to fully resolve the problem.

In the area of water quality, there are many special studies (e.g. landfill monitoring, problem area evaluation) and services (pond monitoring, assistance in working with consultants) that will be desired and needed by the towns. Town/county contracts would provide flexibility to both CCPEDC and the towns in meeting these needs.

It is, therefore, recommended that CCPEDC explore the degree of local support for town/county contracts as soon as possible. Based on this support, CCPEDC should consider drafting enabling legislation that would grant contract authority to Barnstable County for consideration in the 1979 legislative session.

Implementation Schedule

To be completed by Sept. 30, 1979

1. CCPEDC water resources planning staff established

2. Water Resources Advisory Council established

3. Town water quality advisory committees established

4. Initiate facility planning efforts for sewerage treatment systems in:
   - Buzzards Bay/Wareham region
   - Chatham
   - Provincetown/Truro

Make Step 2 application for:

Barnstable,
Falmouth,
Sandwich, South Sagamore
Yarmouth

5. Initiate facility planning for neighborhood solutions and septage facilities in towns with major Category 2 problem areas not covered by sewer facility plans. (See Table 2. .)

   Barnstable (Neighborhood solution)
   Dennis (Neighborhood solution and septage facility if Yarmouth EIS does not recommend regional septage plant with Yarmouth)
   Harwich (Neighborhood solution and septage facility if Chatham 201 plan does not recommend regionalized septage treatment with Harwich)
   Wellfleet (Neighborhood solution and regional septage with Truro)

6. CCPEDC to conduct model on-site system inspection and maintenance program, and develop model health regulations for implementation

7. Towns assess needs and develop budget provisions for hiring adequate professional health staff to implement on-site system inspection and maintenance programs

8. Watershed Protection Districts established in 5-6 towns

9. CCPEDC and County Health Department sign MOU governing their activities in private well sampling program

10. Regional solid waste management plan updated through efforts of CCPEDC Solid Waste Advisory Committee

11. Site for hazardous waste facility is selected by DEQE and plans for the facility are begun

12. EOEA and DEQE issue septage treatment and disposal policy statement

13. Title 5 is reviewed and revised by DEQE

14. MDPW sponsored workshop on road salt application and storage held on Cape Cod as the first in an annual series of such workshops

15. Regulations under Ch. 25 S. 7 A issued by DEQE

16. DEQE agrees to utilize USGS model in approving new wells or well expansion possibly through MOU between USGS, DEQE and CCPEDC

17. Town/county contracts bill submitted to the General Court

18. Public education program initiated with seminars and the publication of public information materials

To be completed by Sept. 30, 1980.

1. Watershed Protection Districts established in all Cape towns

2. Road salt storage sheds constructed (or soon to be constructed) or stockpiles relocated to non-critical areas by all Cape towns

3. Road salt application practices standardized to reduce use by all Cape towns

4. Fire departments inspecting inventory records of bulk oil and gas storage tank owners on a regular basis

5. Bylaw prohibiting underground storage of gasoline and oil in non-fiberglass containers adopted by all towns; and the replacement of steel tanks required

6. Zoning bylaws and subdivision regulations modified in all towns to improve erosion and stormwater runoff control

7. Town bylaw requiring water saving devices adopted in all towns

8. Regional landfill monitoring project arranged between 2-3 cooperating towns, USGS and CCPEDC

9. State Fire Protection Regulations modified to require underground fiberglass storage tanks and to require regular inspection of inventory records.

10. Target date for implementation of on-site system management program in Barnstable and Chatham

To be completed by Sept. 30, 1983

1. First phase of revised regional solid waste management plan implemented.

2. Regional water supply management plan completed and implementation phase underway.

3. Towns have evaluated the impacts of abandoned sanitary landfills and have sealed those threatening critical water resources.

4. Boat occupancy in all major harbors and marinas is controlled through local bylaws and enforcement

5. General Permit Program established for control of storm drains by DWPC

6. BMP's for agricultural activities established by DWPC in the state

7. State hazardous waste disposal facility constructed and is in operation

8. Study of water quality at Otis AFB completed by DEQE

9. Landfill monitoring program established for all landfills near or upgradient of critical water resources

10. Water Resource Protection Districts established in all towns

11. Target date for completion of septage facility construction and implementation of on-site systems management program in all towns

12. Target date for completion of construction of initial phases in sewer service areas in towns indicated in sewer service areas map:

    Barnstable
    Sandwich/South Sagamore
    Falmouth
    Yarmouth

To be completed by 1985

1. Construction of sewerage systems in:

    Buzzards Bay
    Chatham
    Provincetown/Truro

To be completed by 1995

1. Pump out facilities in use at all major harbors and marinas

2. Regional solid waste management plan is operational including construction of all regional facilities. Landfill operations have been eliminated or reduced to a minimum.

3. Target date for construction of future phases of sewer service areas

Town Recommendations 3

Barnstable
Bourne
Brewster
Chatham
Dennis
Eastham
Falmouth
Harwich
Mashpee
Orleans
Provincetown
Sandwich
Truro
Wellfleet
Yarmouth

Recommendations for town action to improve water quality management have been made throughout this final plan. These recommendations apply in general to every Cape town. Some towns may already be following the 208 plan recommendations through their own recognition of the need for action on certain problems, others have recently taken steps to impl-ment some of these recommendations. But many of the recommendations will require the attention of all the towns and a willingness on the part of town boards to work with the 208 staff to adapt these recom-mendations to the particular problems of each town.

The 208 draft plan includes background information on each of the towns in "Town Perspectives" Chapter 7. This background information on the present water quality and wastewater management problems of the town has not been repeated in the final plan. The draft plan should be considered as a reference indicating the need for special attention to those problems addressed in the final plan. These recommendations are aimed at providing a general overview of the priority areas for town action. The towns should also follow the recommendations for town action (where appropriate) as follows:

LAND USE CONTROLS

Towns should cooperate with the 208 staff in establishing "Water Resource Protection Areas" and should adopt the recommended protective measures.

Towns should make land acquisition in "Water Resource Protection Areas" a high priority.

Towns should establish "Seasonal Residential Districts" in their zoning bylaw and control conversions of seasonal dwelling units.

Towns considering taking measures to control serious eutrophication in a pond, should conduct a pond study coordinated with the 208 program.

NON-POINT SOURCE CONTROLS

Sanitary Landfills

Towns should strictly comply with state landfill regulations.

Towns should encourage recycling of materials.

Towns should locate all abandoned landfills and consider sealing with impervious cover to minimize long-term impacts.

Towns should improve septage disposal facilities and regionalize when cost effective.

Stormwater Runoff

Towns should adopt performance regulations for developers to maintain runoff at pre-development rates.

Planning boards should limit amount of impervious surface in residential and other development and encourage natural surface infiltration.

Conservations commissions should investigate suspected storm drains through water quality samples and order removal if causing pollution problem. Boards of health should order upgrading of on-site systems if discharging to storm drain.

Planning boards should require erosion control plans from developers.

Towns should adopt earth removal bylaws regulating operation of sand and gravel pits.

Conservation commissions that suspect a specific agricultural, fertilizer or pesticide use is causing pollution problem should request DWPC to sample area. If use is causing pollution conservation commission should order owner to abate the source.

Gasoline & Oil Storage & Spills

Fire department should conduct regular inspections of inventory records of bulk oil and gasoline storage tanks (may designate this authority to board of health).

Towns should adopt bylaw that prohibits installation of non-fiberglass underground gasoline or oil storage tanks.

Towns should adopt bylaw that requires replacement of all existing steel tanks after 15 years unless owner can prove tank does not leak.

Fire departments should require permits for all gasoline and oil storage tanks, including home fuel oil tanks.

Vessel Discharges

Towns should control boat occupancy in harbors.

Saltwater Intrusion

Towns should dispose of wastewater on land.

Towns should use CCPEDC criteria for future water supply development areas and should have the installation or expansion of wells near shore analyzed by USGS.

Road Salt Application and Storage

Towns should reduce or eliminate road salting in recharge areas of public and private wells. Sand should be used instead of salt.

If towns only reduce road salting, they should use maximum 50-50 sand/salt mixture

Towns should appropriate funds for sheds and move stockpile piles to non-critical areas.

Towns should modify drainage away from recharge areas when repairing roads.

Towns should purchase improved snow application equipment capable of accurately controlling salt application rates.

WATER SUPPLY MANAGEMENT

Towns should cooperate in regional planning to develop a comprehensive water supply management plan.

Towns should adopt recommended land use controls to protect water quality.

WATER CONSERVATION

Water conservation devices should be installed in all town buildings.

Towns should adopt town bylaw that requires water saving devices in all new construction.

Towns should adopt town bylaw requiring new laundromats and existing laundromats replacing old machines to use water saving models.

Towns should adopt town bylaw requiring new car washes to use a re-cycling system.

Water utilities should require 100% metering of services.

Water utilities should restrict lawn watering during summer months and require large irrigation systems to use private water supply.

Water utilities should keep accurate records of use by category of user.

Water utilities should conduct regular leak detection program.

Water utilities should examine present rate schedule to determine if changes are needed that encourage water conservation.

Water utilities should conduct public education program to encourage water conservation.

WASTEWATER MANAGEMENT

The following towns and regions should complete 201 facilities plans and construct the recommended facilities within the first five years of implementation: Provincetown/Truro, Chatham, Yarmouth, Barnstable, Falmouth, Sandwich/South Sagamore.

The Town of Bourne should form water pollution abatement districts in Buzzards Bay and South Sagamore.

Towns should seek assistance of the 208 planning agency in making application for 201 funds, and should maintain close contact with the 208 agency throughout the planning process.

Towns should join a regional effort to develop septage treatment facilities.

The following towns with large Category 2 problem areas should apply for 201 funds to develop decentralized solutions: Barnstable, Bourne, Dennis, Harwich, Orleans and Wellfleet.

Towns should employ a qualified health agent.

Towns should require septage haulers to report locations of systems pumped.

Boards of health should reorganize their files to develop an inventory of on-site systems.

Towns should conduct a sanitary survey in problem areas.

Towns should require failing substandard systems to be upgraded to septic tank systems.

Boards of health should not allow rehabilitation or replacement of cesspools and should not allow the use of chemical scouring agents for rehabilitation of cesspools or leach pits.

Towns should require upgrading of substandard systems prior to issuance of building permits for expansion of living space or conversion of seasonal dwellings.

Towns should assist low income residents in financing upgrading of systems.

Towns should educate homeowners on proper operation and maintenance of septic tank systems.

Towns should establish a maintenance pumping program when adequate septage treatment facilities are available.

Towns should adopt subsurface disposal regulations more stringent than Title 5.

Barnstable

Water Supply Protection

The major 208 concern for Barnstable is the protection of its public water supply wells. The town is presently served by three separate water districts and a private water company. Initial plans for a W. Barnstable Water District are also underway. The water districts and water company should begin immediately to work together in cooperation with CCPEDC staff, to define the areas that should be Watershed Protection Districts.

Barnstable Water Company wells located in Hyannis have shown some elevation of nitrates possibly from the encroachment of development near the wellfields. The possible need for treatment or relocation of these wells in the future should water quality continue to deteriorate, points to the need for Watershed Protection Districts.

The Planning Board appears to be interested in water supply protection as indicated by its recent zoning proposals. The board of selectmen have also indicated willingness to encourage town action in creating Watershed Protection Districts by cooperating with the 208 staff in its watershed protection program in the coming year. The coordination of these town boards and the water utilities is essential to the success of this effort in Barnstable.

Water Quality Planning Coordination

Meeting the water supply and water quality protection needs of the future town population must also be addressed in a coordinated planning approach. Possible consolidation of the water utilities or some formal coordinative mechanism should be seriously considered to insure efficient and effective protection of the town's water resources.

While a number of individuals actively cooperated in the 208 planning program representing certain town boards, there was not a coordinated effort among town boards to participate in the program. Such coordination is essential in both regional and local level water resource planning. It is suggested that the town form a Water Quality Advisory Committee to assume the coordinative function as soon as possible.

Wastewater Management

While the town is presently constructing an expansion of the sewage treatment plant and collection system with EPA 201 funds, it has not addressed all of the wastewater management problem areas in the town. Certain problem areas are included as future phases of the sewer collection system expansion in the "Sewer Service Areas" delineated in the 208 plan. These areas would be eligible for 201 funding assistance If the town wants to expand the collection system beyond these areas with 201 funding, additional 201 facilities planning must be carried out to demonstrate a sewer need exists under present EPA criteria.

It is the position of the 208 program that the present Hyannis treatment plant has the necessary capacity to handle all sewer service area needs in Hyannis. Should the town want to expand the collection system beyond these sewer service areas, 201 funds will not be available for these expansions or for an additional treatment plant. In addition, the need for collection system expansion in the Hyannis area should be carefully considered in assessing the plant's ability to accept wastewater from Yarmouth (which may be an alternative considered in the Yarmouth EIS) since the Hyannis treatment plant cannot be expanded beyond its present capacity.

The town has a professional health agent involved in on-site system management. The town's health regulations already include a number of the 208 recommendations including reporting by septage haulers and upgrading failing systems. Additional health agent staff, however, is needed to conduct inventories of the numerous Category 2 problem areas in the town.

The town should consider, in the near future, entering into a 201 facilities plan to resolve the present Category 2 problem areas possibly through decentralized solutions. Such a 201 facility study should also consider the treatment plant capacity for accepting septage from Mashpee. In addition, the 201 study, as well as the efforts of town boards (especially the Conservation Commission) should address the coastal water quality problems of the town, particularly Lewis Bay. The impact of stormwater runoff and vessel discharges on coastal waters are of particular concern. Until the 201 study is begun, it is suggested that the town consider the stormwater runoff and vessel discharges recommendations a priority for implementation.

Water Quality Monitoring

Finally, the town should continue monitoring its sewage treatment plant and should participate in a regional sanitary landfill monitoring program in cooperation with CCPEDC and the USGS. Both the sewage treatment plant and the sanitary landfill are possibly upgradient of both public and private wells.

Bourne

The Town of Bourne presents unique geographic difficulties to be overcome in water quality management due to its physical division by the Cape Cod Canal. The town is comprised of four separate villages: Bourne and South Sagamore on the south side of the Canal and Buzzards Bay and North Sagamore on the mainland side. The hydrology and land use of the Cape Cod aquifer are described in the "Water Supply" section of this plan. The following water supply discussion includes a brief description of aquifer conditions in the mainland villages.

Water Supply

The geohydrology of the mainland portion of Bourne is similar to the Cape's in that it is made up of glacial moraine and outwash deposits. This area shares the high-yield Plymouth aquifer with other coastal communities of the southeastern Massachusetts region. The aquifer is generally 50-150 feet thick, underlain by bedrock, and groundwater flow radiates from the Bourne/Plymouth border toward the coastal boundaries: Buzzards Bay, the Canal, and Cape Cod Bay, where groundwater discharges to the sea. While the groundwater aquifer is generally recharged by local precipitation, there is some groundwater movement into the area from Plymouth. This could at some point necessitate a regional water supply planning effort. Present wells for these two districts are relatively small, however, and water supply protection measures recommended for the rest of the Cape should be adequate to protect these supplies.

The major land use features on this side of the Canal are dense residential development near the Canal and a large commercial area in Buzzards Bay. Development appears to be encroaching upon the North Sagamore wells, near Cape Cod Bay, and nitrate concentrations in these wells are elevated above background (0.5 ppm) to 1.5-2.5 ppm. (Public health limit is 10.) Land use considerations would, therefore, favor protection of future water supply development areas midway between Buzzards Bay and the North Sagamore/Sandwich border. (See Map 5.6 "Potential Water Supply Development Area.")

In spite of Bourne's innovative land use planning efforts, including a development scheduling zoning bylaw, anticipated growth could threaten present and future water supply areas and other critical water resources. Local officials have voiced particular concern over increasing development along Route 28 near Bourne Village, upgradient of the District wellfields. Implementation of Water Resource Protection Districts and improved land use controls will help protect the town's water resources. The board of selectmen has indicated its willingness to cooperate with the 208 staff in implementing this recommendation in the coming year by signing a cooperative work agreement.

Wastewater Management

The Town of Bourne has a major Category 1 problem area in Buzzards Bay, a densely developed commercial area. On-site system failures in this area have been tied to documented groundwater degradation. South Sagamore also has a small Category 1 area, due to high density residential

development. Working with the town, the 208 staff have developed recommendations for regional sewered solutions for these areas. It is recommended that water pollution abatement districts be formed in these two problem areas to coincide with water and fire district boundaries, and that they join with the neighboring communities of Wareham and Sandwich for regional sewerage collection and treatment.

The Wareham treatment plant is planned to serve the area adjacent to Buzzards Bay and has the capacity to accept sewage from Buzzards Bay. The Southeastern Regional Planning and Economic Development District's 208 plan recommends that Wareham's sewer lines, when extended to the Bourne border, should be large enough to accommodate Buzzards Bay. It should be noted that the area adjacent to Little Buttermilk Bay is not proposed as an initial sewer service area (See "Sewer Construction Projects" discussion) but as a "future phase." This area was included for purposes of calculating design flows for a sewage treatment facility, however, this should not preclude consideration of neighborhood and on-site solutions in the area.

The Sandwich sewer facility plan includes consideration of regionalization for sewage treatment and disposal with South Sagamore. Flows calculated for Table 2.3 account for existing flow from this area with no expansion. The Towns of Bourne and Sandwich should begin negotiations to implement this solution as soon as possible.

The Town of Bourne has several fairly large Category 2 problem areas which should be investigated and on-site or neighborhood solutions implemented. The largest area, along Route 28 in Bourne Village, is designated "Category 2" because of the level of concern expressed by local officials over this area's proximity to the District's wellfields. It is likely that watershed protection measures are as important in this area as wastewater management facilities.

It is the general recommendation of this plan that a town with substantial Category 2 problem areas should apply for 201 facility planning funds to abate existing problems and construct a septage facility. Members of the Bourne 208 review committee felt strongly, however, that the town would not support a town-wide approach to wastewater management after its failure to move ahead with the sewer plan developed in 1975. For this reason the town prefers the district approach recommended above. The town itself must then assume full responsibility for investigating and correcting problems in remaining problem areas. Should the town be unsuccessful in implementing this approach it should reconsider the possibility of conducting a 201 study.

On-site system management should be implemented throughout the unsewered sections of Bourne, including a maintenance pumping program when adequate septage facilities are available. The town is in the process of constructing a septage lagoon system, but it should be aware that improved septage treatment is needed to abate groundwater contamination associated with lagoons. (See "Neighborhood Solutions and Septage Treatment" discussion.) Further details and costs of all of these recommendations are found in the "Wastewater Management" sections cited above.

Water Supply Planning and Coordination

At the time of publication of the draft plan Bourne has demonstrated its willingness to cooperate with 208 recommendations and watershed protection program by appointing a local water quality advisory committee. This committee should play a key role in both water supply and wastewater projects in the future.

Brewster

Water Supply Protection

Brewster is presently in the fortunate position of having major undeveloped areas that protect large portions of the lower Cape groundwater basin. There are large areas of the town that could serve as future water supply development areas not only for Brewster, but also for the other towns in the basin. Given the 208 program population projections, it is likely that many of these areas will remain protected over the planning period.

However, Brewster does face substantial development pressures now and in the future. Present and future town well sites should be protected from the non-point sources resulting from this development by creating Watershed Protection Districts. The town should also cooperate in regional water supply planning efforts to determine the future water supply needs of neighboring towns and whether Brewster will be called upon to assist in supplying these areas.

Wastewater Management

While Brewster is a small town, it has a full-time qualified health agent who is already implementing many of the on-site system management recommendations of the 208 plan. The health agent requires septage haulers to report all pump-outs and through this program has successfully required the upgrading of on-site systems as they fail. The wastewater management problem areas that exist in the town are thus being corrected through this follow-up approach.

Through the work of the health agent strictly enforcing Title 5, it is expected that no new problem areas will develop and that present problem areas will be controlled during the planning period. While the town does not have any sewer facility construction needs, it will need to improve its treatment and disposal of septage obtained from the on-site systems used throughout the town.

The Orleans 201 facility plan will soon be underway and the cooperation of Brewster in the planning of a septage facility in Orleans that can meet Brewster's septage treatment needs is highly recommended. This facility would be the first regional septage treatment facility on the Cape and would offer the towns of Brewster, Orleans and Eastham an opportunity to deal on a long-term basis with their septage handling problems and to implement an on-site system management program.

Water Quality Monitoring

It is recommended that Brewster consider cooperating in a regional landfill monitoring program in cooperation with CCPEDC and the USGS. Such a monitoring effort would be particularly important if the town expands its present landfill.

Water Quality Planning Coordination

Town officials have cooperated in the 208 program and have been concerned with integrating 208 recommendations into the town's zoning and health regulations. The need for continued cooperation particularly in the area of watershed protection suggests that the town should form a Water Quality Advisory Committee to coordinate the efforts of the town boards involved in water quality management. The first task of the committee might be participation in facility planning for regional septage treatment with Orleans.

Chatham

Wastewater Management

Chatham now has plans to seek 201 funds to conduct a Step 1 facilities plan. The 208 program supports Chatham in this effort and agrees that a Step 1 study is needed to examine the present capacity of the town's sewage treatment plant and the possible need to expand the present collection system. However, the 201 facility plan should be town-wide in scope and should fully evaluate all problem areas in the town including coastal water problems.

The 208 program also suggests that the town fully examine all problem areas considered for expansion in terms of present EPA criteria for determining sewer needs. Since most of the costs for such expansion are not eligible for 201 funding, the town is likely to find the cost of extensive expansion is very high.

The 201 study should also address the secondary growth impacts, particularly strip commercial development, that such expansion down Route 28 might cause. The extension of the sewer collection system will also result in an increased flow at the treatment plant. The 201 study should examine the impacts of this increased flow through a monitoring system and should consider the possibility of supplying public water to private wells that are located downgradient of the treatment plant.

By 1979, the Chatham sewage treatment plant will be modified to accept septage. This modification will increase the flow at the plant and potentially improve the operation of the facility. Once the operation of the treatment plant is stabilized at this flow, the town should work with the 208 staff to project the flows that would be generated by a regular on-site system maintenance program throughout the town. This analysis could be carried out as part of the Step 1 facilities study. Based on this analysis, an appropriate on-site system maintenance schedule should be implemented. As suggested in the "Neighborhood Solutions and Septage Treatment" section the Chatham 201 should consider the feasibility of accepting septage from Harwich.

Water Quality Planning and Coordination

Throughout the 208 program, Chatham officials and citizens have actively participated in the development of 208 plan recommendations. With the Metcalf & Eddy Natural Resources Study as a basis, the town has been far-sighted in its water quality and water supply planning efforts. The Natural Resources Advisory Committee and other town boards have been working together to solve many of the issues that were raised in the M & E study, but many of these issues remain unresolved. Recent interest by the planning board to revise the town's master plan through a comprehensive planning effort is most encouraging and indicates that future attention will be given to planning decisions over the next few years.

While the Natural Resources Advisory Committee has performed a valuable coordinative function in reviewing the 208 plan, it is recommended that the town make a formal appointment of a Local Water Quality Advisory Committee to participate in both the 201 facility planning effort and to work with CCPEDC in designating watershed protection areas.

Water Supply Protection

A major concern of the 208 program for the town's planning effort is the adoption of watershed protection districts for the public wells owned by the Chatham Water Co. While the town has purchased a large watershed area for future water supply development, the watershed areas around the present wells serving the town can best be described as minimal. The importance of watershed protection districts is illustrated by the "Recharge Area Needs" Map 5.5 in the draft plan. The water supply protection needs of the town will become increasingly difficult as the population grows. The present water supply wells are already located close to the Harwich town line and may be drawing water from Harwich. As the capacity of these wells is expanded, even more water will be drawn from Harwich. It is for this reason, that it is particularly important for Chatham to also cooperate in regional water supply planning efforts.

Dennis

Implementation of the 208 water quality plan in Dennis should give priority to establishing watershed protection districts and implementing on-site system management and septage treatment.

Water Supply Protection

Dennis has extended its public water system to serve most sections of the town. The Water District has developed extensive wellfields and pumping capacity, which should require little expansion to serve the 1995 population. Wells are clustered in the center of the town, near the groundwater divide, which should simplify watershed area identification and protection. The one complicating factor is that wells located in eastern parts of the town, may be drawing recharge from western Brewster. Further investigation may indicate the need for a cooperative effort to implement watershed protection measures in both towns.

It is suggested in the "Water Supply" section of the final 208 plan that Dennis is part of a natural groundwater subregion with Brewster, Harwich, Chatham and Orleans. The need for regional water supply planning and management within this "basin" is also pointed out. Dennis has water of extremely high quality and a potential yield of 12 million gallons a day. This implies that Dennis may have water resources in excess of its needs, which could be called upon to supply other towns in the future.

The town must explore the amount of recharge area that would be required to protect its projected yield, however, and determine whether present land uses and projected growth are favorable to watershed protection. As indicated in map "Potential Water Supply Development Areas," dense development in the southern half of Dennis and along Bass River may restrict the amount or area available for recharge protection purposes. The town should work with the 208 program to determine present densities within the wellfield recharge areas and develop necessary zoning changes.

One public supply well, number 13, is located potentially downgradient of the town landfill. This well was not pumped in 1975. Future use should be coordinated with a monitoring program. The town should also be aware that golf course maintenance can potentially affect groundwater quality since the Dennis Pines Golf Course is in the vicinity of some of the town's eastern wellfields. Fertilizing practices should be carefully regulated to control nitrogen leaching to the groudwater and the town should consider monitoring water quality under the golf course to evaluate the effectiveness of control measures.

Wastewater Management

Dennis has a professional health agent and the town's health regulations already implement many of the 208 plan recommendations. The health agent has made a concerted effort to require upgrading of failing systems through a follow up method, and has mailed notices to homeowners to encourage them to pump their septic systems regularly.

The town does have a substantial Category 2 problem area on the south side. This area is largely seasonal and may become a more serious problem as seasonal conversions to year-round homes increase. It is recommended that the town consider creating a "Seasonal Residential District" in the area south of Lower County Road and carefully control the conversion of seasonal dwellings in this area. The town should consider seeking 201 funds to conduct a study of this area, along with other problem areas and septage facility needs to determine if small scale treatment systems may be needed.

Groundwater quality problems downgradient of the septage pits were detected in the 208 water quality assessment. Septage treatment is a problem in Dennis. It is recommended in the discussion of "Facility Planning in Non-Sewered Areas" that Dennis should join with Yarmouth in a regional facility. Preliminary findings of the Yarmouth Environmental Impact Study indicate that this may not be feasible. One alternative under consideration is that Yarmouth build a small sewage treatment plant which could accept Yarmouth's septage flows but would have no additional capacity to regionalize with Dennis.

If Yarmouth chooses the small plant alternative, Dennis should proceed with plans for its own septage facility. Since the town is not planning to construct any sewage collection systems, septage flows may be large enough to make a separate facility cost-effective. Another possibility that should be investigated is regionalization with Harwich.

Eastham

Eastham should give priority to improving Title 5 enforcement and controlling conversion of seasonal dwellings. It is recommended in the On-site System Management section that Eastham apply jointly with either Orleans or Wellfleet for state funding assistance for a professional health agent. The health agent should direct his efforts at requiring upgrading of cesspools to septic tanks and developing an inventory of failed systems.

Control of Seasonal Areas

The entire western shore of Eastham is densely developed with seasonal dwellings using cesspools and private wells. The town should work with CCPEDC to implement a Seasonal Residential District in this area, requiring that Article 2 "Minimum Standards for Human Habitation" and Title 5 be met prior to conversion.

Water Supply

Water supply is also of concern in Eastham. The high density areas described above and the town's present 20,000 square foot minimum lot size are not considered to provide adequate protection of private wells. It is suggested that the town begin to implement its water supply plan in the near future to serve densely populated areas, and areas around the town landfill. Interconnection with Orleans to serve Bridge Road should also be explored.

Development of the water supply should be done cautiously to avoid salt water intrusion and use of the USGS groundwater model should be helpful to consultants in planning the location of town wells.

It is recommended that the town's 113-acre parcel inside the National Park be reserved for water supply development purposes.

Solid Waste

The town should install water table wells around the existing landfill to determine the probable direction of groundwater flow from the site. Technical assistance is available in the design of such a system from CCPEDC. USGS water table data is insufficient in this area because the landfill is located near the groundwater divide.

Further studies in cooperation with USGS may be necessary to locate the plume, since public water is not available and development is encroaching on the landfill area.

The town should join regional waste disposal planning efforts in the hopes that a regional solution will be available before the existing site is exhausted.

Eastham should join with Orleans in construction of a regional septage facility. Orleans has already initiated a 201 application for a septage plant. It is recommended in the "Facilities Planning for Non-Sewered Areas" that the state and EPA fund a 3-town regional plant in Orleans to serve Orleans, Eastham and Brewster. The town should form a Water Quality Advisory Committee to work with Orleans in planning this treatment facility.

Falmouth

Sewer Construction

The immediate priority for Falmouth is resolution of the sewer controversy. The draft 208 plan presented sewer service areas for Falmouth which included Falmouth Village and Woods Hole. These were based on the sewer needs model developed for the 208 plan, local input, the preliminary facility plan prepared by Camp, Dresser & McKee (1976) and private studies (APCC, 1977). Further, the Commissioner of DEQE has notified the town on several occasions that the downtown situation constitutes a violation of Title 5 and the town is under orders by DWPC to abate the discharge of raw sewage at Woods Hole.

A survey of residents and potential sewer users was conducted in the summer of 1978 to determine whether they would be willing to pay for sewers. The users were provided with information that sewering would cost them $4,000 over the first 10 years of operation. Two-thirds of the questionnaire responses were against sewering. On the basis of this questionnaire, the Department of Public Works advised the DWPC that the town did not want to sewer Falmouth Village, and recommended upgrading of the existing outfall in Woods Hole to comply with NPDES orders. The DWPC concurred and ordered the town to take immediate action to complete a facility plan for Woods Hole or to begin construction of sewers in downtown Falmouth.

Town meeting voted on September 27, 1978 to appropriate additional funds to complete a facility plan for both Woods Hole and Falmouth Village. Although this vote was not in complete conformance with the orders of DWPC, it is recommended that DWPC not prosecute the town as long as it is moving in a positive direction towards completion of a comprehensive plan to solve Falmouth's problems. The town should be required to complete the facility plan as voted and hold a public hearing on the plan. If town meeting action is not taken expeditiously on the final plan recommendations, the DWPC and DEQE should pursue regulatory actions.

Camp, Dresser & McKee evaluated three treatment and disposal alternatives, including a single outfall off Nobska point, inland treatment with spray irrigation and a two-plant alternative with a small outfall using the existing discharge pipe, and inland treatment of the effluent. On the basis of information presented by Camp, Dresser & McKee (1976, 1978), the spray-irrigation alternative is the one which best meets 208 criteria. It is also most consistent with federal policies on innovative approaches, and cost-effective guidelines. This is the recommended alternative in the "Sewer Construction Projects" section.

It is expected, however, that the additional 201 work will address in more detail septage handling, on-site system management and control of sodium chloride concentrations in the recharged effluent. Sewer service areas should be given a final review, taking into consideration recent information from the health agent and the need for major systems such as the Falmouth Hospital and the High School to be serviced. It is also recommended that the town refer to the discussion of Otis Air Force Base as a watershed area (see "Water Supply Management") and obtain data on the USGS study of the wastewater plume from the existing sand filterbeds.

The new data should be available from USGS during the planning period. Final determination of consistency of the facility plan with 208 policies will depend upon evaluation of these issues.

On-Site System Management

The health agent for the town has stated that there are critical problems with on-site system failures and Title 5 enforcement, both within and outside of, proposed sewer service areas. Additional staffing for the health department is essential to correct these problems.

The board of health has attempted to require the septage haulers to report systems pumped, but has been challenged by the haulers on the legality of the regulation. It is the recommendation of this plan that the board is acting within its authority and should pursue its regulation and proceed to fine or suspend licenses of those refusing to cooperate. A maintenance pumping program should be implemented as part of the facility plan.

Water Supply Protection

The town of Falmouth adopted the first Watershed Protection District bylaw on Cape Cod. While passage of this bylaw is a major accomplishment, it is recommended that the town work with CCPEDC in inventorying non-point sources within the area, and bringing control measures into closer conformance with the 208 recommendations. The town has expressed its willingness to do so.

Of particular concern to water supply protection is the location of the town disposal area potentially upgradient of Long Pond and within the watershed protection area. Also located upgradient of Long Pond is the new high school with a large septic system.

Finally, the new wellfield area in the northeast portion of the town appears to be potentially downgradient of the sand filterbeds at Otis. Priority should be given to groundwater monitoring at these sites.

Water Quality Coordination

Falmouth's difficulties with sewer system planning and construction have a 30 year history. The social and economic complexities of the town, particularly the location of the scientific institutions at Woods Hole have contributed to the town's past inabilities to take action. While it is recognized that there is no easy resolution to this situation, it is strongly recommended that the town appoint a water quality advisory committee.

A 208 review committee held very productive discussions during the draft review process. The involvement of such a committee throughout the 201 process could be very helpful in avoiding future conflicts arising from an exclusive role of any one department in sewer planning. It is hoped that the 208 review committee or another committee with similar representation, including the DPW, will assume this coordinative role.

Harwich

Wastewater Management

In most areas of the town, preventive zoning, regulatory and maintenance measures should enable the town to avoid future sewer needs. It has been stated by public officials throughout the 208 program that this is the intention of the town. However, the 208 program staff is concerned that the town recognize that the Category 2 problem areas on the south side of town need special attention. Current trends toward increasing zoning density in these areas should be examined very carefully to avoid any possible intensification of the problems in this area. It is also suggested that the town consider establishing "Seasonal Residential Districts" in this area to control the conversion of seasonal dwellings to year-round occupancy when the on-site systems are inadequate.

The town should be aware that the 208 plan does not indicate a sewer need in Harwich. This means that the town will not be eligible for a major central collection system for twenty years. Strong enforcement of the on-site system management recommendations in the town's wastewater management problem areas should be sufficient to control these problems. The town may wish to conduct a 201 facilities study at some point in the future to investigate possible small scale solutions for existing problem areas and the septage treatment needs of the town. New wastewater management problems created by the town's failure to take recommended actions for on-site system management will not be eligible for future 201 construction funds.

While Harwich presently has a state approved interim lagoon, the town should not view this system as a long-term solution to its septage treatment problems. The town should refer to Table 2.7 for comments on possible regionalization with either Chatham or Dennis for septage facility construction.

Water Supply Protection

The town's present water supply wells are generally well protected with most areas around the wells zoned for 40,000 square foot lots. However, in recent weeks there has been considerable concern raised over the possible development of a large subdivision and golf course upgradient of the town's wellfield. Such development could have adverse impacts on the water quality of the well and should be carefully examined prior to the town granting authorization for the increased density it requires. The town should also consider purchasing additional areas to protect the town wells.

It is further recommended that the town cooperate with the 208 program staff to delineate watershed areas and to adopt the recommended Watershed Protection Districts to avoid the possible encroachment of high density development on wellfields.

Mashpee

The town of Mashpee presently has a very limited public water supply system which serves only New Seabury and which is owned and operated by a private water company, the High Wood Water Co. The entire town relies on on-site systems for wastewater disposal. While there does not appear to be any major wastewater management problem areas indicated by the 208 program, pond water quality has been a problem of concern to the town for a number of years.

Water Supply Protection

The town currently has no active plans to establish a public water supply system to serve areas outside of New Seabury. The board of health, however, has been seeking the consideration of designating an area for future public water supply development. The specific location of this area should be coordinated with the 208 program to insure that the area is not downgradient or does not include potential pollution sources.

The town should protect the future water supply development area, once defined, with a Watershed Protection District. The board of selectmen have already indicated their willingness to cooperate with the 208 staff in defining the area to be protected in the coming year.

Wastewater Management

Non-structural solutions, including careful management of on-site systems, water conservation and innovative options should be adequate to avoid creation of future sewer needs. Mashpee is not highly developed and is in an excellent position to plan development and manage subsurface disposal to avoid future problems.

Mashpee should participate in regional septage planning with neighboring towns (Sandwich, Falmouth and Barnstable) to determine the most cost-effective means of disposing of its septic wastes. The town should refer to the "Neighborhood Solutions and Septage Treatment" section for further information.

Pond Management

The town has been concerned about the condition of recreational ponds that have significant development around them, particularly Johns and Ashumet Ponds. Extensive water quality testing has been conducted on Johns Pond, and the town is interested in implementing a pond management program. The 208 program has assisted the town in obtaining an intensive study of Johns Pond during FY 79 by DWPC that will assist the town is assessing appropriate management techniques. It is suggested that the town continue to pursue funding sources, in cooperation with the 208 program, to support a model pond management program on Johns Pond.

It is further suggested that the town adopt a "Great Pond Protection District" as part of its zoning by-laws to begin such a management pro-

gram. The 208 planning staff will provide technical assistance to the town in delineating the areas around a model pond that should be included in a "Great Pond Protection District."

Solid Waste

The town is currently seeking to expand the landfill area with DEQE approval of an adjacent area. Approval of this assignment is still under DEQE consideration. If approval is not given, it may be necessary to consider relocating the landfill. However, the town should try to avoid establishing a new landfill site and should actively pursue regional solutions as a preferred alternative.

The landfill plume may be flowing towards the Mashpee River. If private wells are found to be downgradient there may be a need for town water service to the area.

Orleans

The major problems in Orleans at present are septage management, failing systems in the town center, and protection of water quality in the municipal wells. Since most of the town will continue to rely on on-site systems, a comprehensive management program is essential.

Wastewater Management

Orleans is one of the first towns on the Cape to take positive action to abate the serious problems posed by septage disposal. The town has had a preliminary feasibility study prepared by Linenthal, Anderson and Eisenberg which recommends superchlorination by the Purifax process at the landfill site. This was submitted to the EPA for 201 funding, but the EPA has informed Orleans that a full 201 facilities plan will be required.

The 208 staff has worked with the town and its consultant on the development of a scope of work that would adequately address the problems in downtown Orleans, which may need to be sewered with a small neighborhood system, and also that would consider regionalized septage treatment with Eastham and Brewster. The town is referred to the section of this plan titled "Facilities Planning in Non-sewered Areas" for recommendations on the scope of study required and recommendations on septage treatment and disposal.

Water Supply Protection

The major water supply protection measure required in Orleans is a detailed geo-hydrologic investigation and monitoring of the landfill site. It is located near the public supply wells, and although previous studies have indicated that the direction of flow is away from the wells, the actual plume location has not been determined. This is critical if the site is to be used as a septage disposal site in the future.

The town's wellfields are located near the Brewster border on a 500-acre watershed owned and protected by the town. The area partially abuts the Nickerson State Park which is used only seasonally and at very low density. Areas of both Brewster and the Nickerson Park lie upgradient of Orlean's wellfield and also within the calculated area of contribution of the existing wellfields. A coordinated land use analysis coordinated with Brewster is necessary to determine watershed protection needs for Orleans.

Orleans is referred to the Water Supply discussion regarding the "Lower Cape Region." Because of the proximity of saltwater to much of Orleans, it is likely that future expansions of the water supply will need to be coordinated with Brewster.

On-Site System Management

The 208 staff has discussed with the town its recommendation that a full-time professional health agent is essential to the effective enforcement

of Title 5. Since the town has indicated it is not prepared to present such a proposal to town meeting at this time, it is recommended that sharing of a health agent with Eastham under the State Department of Public Health funding program be considered (see "On-Site System Management Program).

The town has begun requiring septage haulers to report locations of systems serviced and is accumulating information on the occurrence of failures in the town. Orleans has difficult soils in East Orleans and should pay particular attention to failures which might be due to improper soils evaluations or installation. Title 5 enforcement is critical in these areas.

The town has indicated its interest in beginning a sanitary survey and inspection program. The 208 program will provide technical assistance to the town in this project through its continuing program.

Water Quality Coordination

It is recommended that the town appoint a water quality advisory committee (see "Management Agencies" discussion) to work with the selectmen and consultants during the 201 planning process.

Provincetown

Water Supply

Provincetown's immediate water quality concern is water supply. With the South Hollow wellfield closed down due to a gasoline spill and salt water intrusion threatening the Knowle's Crossing wellfield, the town must take immediate actions to ensure an adequate short-term supply and a permanent water supply. If successful, the recommended short-term solution, bioreclamation at the gasoline spill site, could restore useful capacity of the South Hollow wellfield by the summer of 1980. Under this scheme the town would need to continue to use the temporary wellfields within the National Park and at the North Truro Air Force Base in 1979. Even with restored use of the South Hollow wellfield, however, the capacity of the water system falls short of supplying the present needs.

Provincetown must develop a water supply master plan to assure that the present needs can be met without damage to the groundwater supply or the natural environment. Resolution of the shortage must be in keeping with National Park mandate to preserve the unique ecology and water-related natural resources within its boundaries. It must not, however, jeopardize private wells or natural resources outside the Park upon which the area's tourist economy is heavily dependent.

Two alternative future supplies have been proposed for investigation: Well site 4 within the Park, site of the present temporary wellfield, and Atkins-Mayo Road site within Provincetown, which would require extensive water treatment. Both sites must be approached with caution. Site number 4 is between Knowle's Crossing and the South Hollow wellfield. It is of concern to the 208 program that simultaneous pumping of the three sites could cause acceleration of saltwater intrusion into Knowle's Crossing or private coastal wells. The "recharge" area calculated for the Atkins-Mayo site would include a large section of Provincetown's east end, an area which is believed to be heavily saturated with wastewater. The water table also is very low at the site, making vertical saltwater intrusion a major potential hazard. Further evaluation of the site should also examine the potential effects on water table levels in natural bogs in the Provincelands.

It is recommended that Provincetown work with Truro, the Massachusetts Water Resources Commission and the National Park Service in investigating long-term water supply solutions. The USGS computer model should be used through the ongoing cooperative agreement between CCPEDC and USGS to test the impacts of management alternatives. The area of consideration for potential supply should be extended to the Long Nook Road site which was evaluated by USGS in 1974 for its potential to yield a 1 MGD supply. The conclusions of that study indicated that the withdrawal from that site might be accomplished with minimal environmental impacts.

The National Park Service's firm policies regarding removal of water from a National Park are discussed in the "Water Supply Management" section and should be respected throughout the water planning effort. Principally the town must fully investigate all alternatives and all possible environmental impacts within and outside the Park. Growth control and demand reduction through mandatory installation of water conservation

fixtures should be given full consideration. Finally, the impact of additional withdrawals from Truro on private well supplies must be evaluated, and a monitoring network for lateral and vertical saltwater intrusion should be incorporated into any water development plan. An extended arrangement of withdrawal of water from the Park should only be permitted by the Park if it proves to be the only environmentally sound and economically feasible solution.

Wastewater Management

Provincetown also has a serious wastewater management problem in the downtown area. Several areas of Provincetown Harbor are presently closed to shellfishing and the 1975 water quality survey conducted by the DWPC indicated present water quality to be SC in the harbor. Several private studies of water quality have been commissioned by the town and have concluded that contamination threatening public health exists in the harbor. Storm drains have been cited as the major source, to which septic system overflows are believed to be contributors. It is public knowledge that failing cesspools are widely used by commercial establishments and are pumped as often as three times a day during the summer. It is believed by the 208 agency and the DWPC that available information substantiates the need for sewers in Provincetown (see "Sewer Construction Projects" section). For this reason it is recommended that if the town fails to initiate a 201 study to update and implement facility plans completed for the town in 1975 (Weston & Sampson) by 1980, the DEQE should take enforcement action against the town for violations of Title 5. The town should note that the "Sewer Construction Projects" section recommends that Beach Point in North Truro should be included in the facility plan.

Facility planning for Provincetown must take into consideration the uniquely fragile hydrologic and ecological characteristics of the area. As discussed in the "Groundwater Basin" section, Provincetown is underlain by a groundwater lens which is separated from that of the North Truro basin. Importation of water supply from Truro is an inter-basin transfer of water which contributes artificial recharge to the Provincetown basin. Augmentation of water supply to be disposed of on-site will raise the water table in downtown Provincetown, aggravating on-site system problems. Sewering will lower the water table in downtown area, but problems of infiltration and construction in sandy soils may still be encountered. Ideally, Provincetown's wastewater should be returned to the North Truro basin to restore the natural hydrological cycle and recharge the groundwater supply. Discharge anywhere in Provincetown or Truro will probably require advanced waste treatment because of proximity to water supplies. Finally, the limitations of the water supply must be recognized and firm measures taken to prevent stimulation of growth by sewer construction.

Planning Coordination

It is recommended that the water and sewage problems be studied in a coordinated effort. The town should form a Water Quality Advisory Committee (see "Management Agencies") to work with both planning efforts.

Sandwich

Wastewater Management

Prompt action is needed to abate public health problems and water quality degradation occurring in the town's Category 1 areas. A sewer facilities plan was completed for Sandwich in 1978, but changes in the Ocean Sanctuaries Act have obstructed implementation of the recommended alternative. The plan calls for a small outfall into the Cape Cod Canal, which now could only be allowed through a special act of the legislature. The Department of Environmental Management, responsible for implementation of the Ocean Sanctuaries Act, has already indicated its reluctance to endorse such legislation.

It is apparent that additional work may be necessary. Alternatives may need to be re-examined if the town is to justify its choice of outfall disposal. Under both the Ocean Sanctuaries Act and the EPA land treatment policies it must be determined that there is no economically feasible alternative. It is strongly recommended that EPA make available necessary work.

The town should continue to pursue a sewering program to abate Category 1 problem areas in spite of these difficulties. Regionalization with South Sagamore is recommended. Should the town fail to act by 1980, a DEQE investigation of Title 5 violations should be initiated.

Construction of a septage disposal facility has been suggested as an alternative to sewering and has been proposed by some individuals in the town. A septage treatment facility would not provide a comprehensive solution to the town's wastewater management problems and could not be considered to be consistent with the 208 plan. Therefore, it would be the 208 recommendation that 201 funds not be made available for the construction of a septage treatment facility.

The town health agent should strictly enforce Title 5 and should seek additional qualified personnel to implement the 208 recommended on-site systems management program to avoid the development of additional problem areas.

Water Supply Management

The town has taken progressive steps to increase lot sizes to at least one acre in most areas of town. The town has indicated willingness to cooperate with the 208 staff in delineating watershed areas and in adopting Watershed Protection Districts in the coming year. With these actions, it is believed that Sandwich will have an adequately protected future water supply.

The problem of the State Fish Hatchery discharging over half a million gallons of fresh water must be addressed by the Department of Fisheries and Wildlife as recommended in the "Water Conservation" section of the final plan.

Solid Waste Management

Sandwich faces the possibility of exhausting its present landfill area within the next few years. In addition, its septage disposal at this site causes considerable concern for groundwater quality. The town should actively participate in regional solid waste planning to develop a long-range solution to its solid waste management problems.

Water Quality Planning Coordination

There has been a serious delay in action on the town's proposed sewer facility plan and little coordinated participation of town boards in the 208 planning program. The town should immediately form a Water Quality Advisory Committee to take a leadership role in implementing the 201 facilities plan and to more fully coordinate its wastewater management efforts with the 208 program.

Truro

Water Supply

The major problem facing Truro is Provincetown's need for additional municipal water supplies. As discussed in the "Water Supply" section, Provincetown presently has two wellfields in Truro, by permission of the Massachusetts legislature. A recent gasoline spill from a leaking service station storage tank has resulted in contamination of the groundwater approximately 600 feet from the South Hollow Wellfield.

The wellfield was shut down for the summer of 1978 and emergency water supplies obtained from the National Park and North Truro Air Force Base. It has been proposed (Camp, Dresser, McKee, 1978) that the gasoline spill be cleaned up through a bioreclamation process. Even if the South Hollow Wellfield is put back into production, however, Provincetown presently needs an additional permanent water supply. Present maximum day demands are 2.8 MGD and will increase to 3.0 by 2000. The existing capacity is only 2.0 MGD.

It is recommended in the "Water Supply" section that development of a water supply plan for the outer Cape groundwater basins should be given immediate priority by local, regional and federal agencies to assure that development of additional wells is done without adverse impacts to the natural environment or private wells which most of Truro's residents depend upon for water supply. Growth controls and water conservation must be given full consideration in such a planning effort to assure that the groundwater resource is not overdeveloped.

Wastewater Management

The National Seashore Park occupies and preserves nearly 70% of the land area in Truro, and the remaining developable land is zoned for 37,000+ lots. With low density thus ensured and with Truro's naturally sandy soils, the town's wastewater problems are limited to a small strip of commercial development along a low-lying barrier beach known as Beach Point. This area of seasonal cottages and motels is adjacent to Provincetown's high density commercial area. The area has been indicated in the Problem Areas Map on the basis of density, unstable soils and proximity to the water table and Cape Cod Bay. It was included in the Sewer Service Areas Map on the basis of the likely cost-effectiveness of sewering this area if a sewer is built for Provincetown. It is recommended that Truro cooperate with Provincetown in facility planning for this reason. There is no evidence that the Beach Point area itself is a severe wastewater problem, however, and it is not recommended that Truro undertake a facility plan by itself.

During the review period the local officials of Truro expressed concern over the possible growth impacts of sewering an environmentally fragile area like Beach Point, and problems with sewer construction in areas with high water table and unstable soils. A means of growth control should be included in any facility plan for this reason, and alterntive collection systems including pressure sewers should be investigated.

For the remainder of the town septage treatment and on-site system management should be adequate to abate wastewater problems. It is recommended in the "Neighborhood Solutions and Septage Treatment" section that Truro join with Wellfleet for a septage facility and request participation by the North Truro Air Force Base in the regional facility plan. A joint application with Wellfleet for state funding for a shared professional health agent is also recommended. (See "On-site System Management")

Water Quality Monitoring

As discussed in the draft plan, a segment of the Pamet River is contaminated with coliform bacteria. The Mass Division of Water Pollution Control has suggested that the source is a backyard farm on South Pamet Road. The town should seek further assistance from the County Health Department in investigating the problem, and request assistance from the Soil Conservation Service in control of agricultural runoff.

Further investigation is also recommended of the water quality impacts of the landfill and septage pits. The town should contact CCPEDC for technical assistance on setting up a monitoring system.

Wellfleet

Wastewater Management

The Town of Wellfleet is similar to Eastham and Truro in that it has a high influx of summer population and has no municipal water or sewer system. The major difference is that Wellfleet has a relatively densely populated downtown area which is indicated in the Wastewater Problem Areas Map as a "Category 2" problem area. This means that upgrading of failing cesspools to septic tank systems is necessary, but that a small neighborhood sewer system may be needed. A septage treatment facility is needed to serve the remainder of the town.

The town should refer to the section entitled "Neighborhood Solutions and Septage Treatment" for more information on the costs and range of alternatives which are available to the town. It is recommended that the town regionalize with Truro for construction of a septage facility. Since Wellfleet has a major Category 2 problem area it would be the most appropriate town to be a lead agency and conduct a full 201 facility plan within the town boundaries.

On-site system installation and management should be administered by a professional health agent. Wellfleet should join with either Eastham or Truro and apply for state funds for a shared health agent. (see "On-site System Management" discussion.)

Water Supply

There is an immediate need for a public water supply in Wellfleet Center. This is evident from the high density of development and has been documented in the past through tests performed by the County Health Department. While it may be in the somewhat distant future, the possibility of Wellfleet's participating in regional water supply development cannot be dismissed. As in the case with Eastham and Truro, the optimum location for municipal wellfields would be in the portions of the town protected by the National Seashore Park.

Since Wellfleet is one of the few Cape Cod towns which has no water supply engineering plan, a combined water and sewer study would be desirable. The town should seek assistance from CCPEDC in obtaining funding for such a study. The town should protect future water supply development areas, and retain town-owned parcels near National Park large enough to serve as wellsites.

Monitoring Needs

The landfill is located in a relatively unpopulated area at present. Since no public water supply is available, however, determining the direction of flow from the landfill is recommended. The town should also investigate possible effects on the Herring River from leachate. A monitoring system for any new landfill site would be a priority to be set up at the time of construction.

The town is encouraged to seriously consider regional solid waste disposal options prior to relocating the landfill.

Planning Coordination

The town planning board is presently revising its master plan. Water quality should be a priority consideration, and should be coordinated through the establishment of a water quality advisory committee (see "Management Agencies").

Yarmouth

Yarmouth is extensively developed in suburban densities throughout the southern half of the town. Wastewater management problems are reported to be severe in the commercial zone along Route 28. Water supply protection is also of critical concern to the town since development is rapidly encroaching upon existing and future wellfield areas.

Wastewater Management

Facilities plans were prepared for the town by Whitman & Howard in 1975 and 1976, proposing a 4 MGD sewer system and a Purifax septage treatment plant. An Environmental Impact Study has been underway in 1977-78 to re-evaluate these proposals. The following preliminary findings of the impact study have been presented to the town.

--The site purchased by the town for the treatment plant does not meet requirements for rapid infiltration beds because of high water table. The area may be acceptable for spray-irrigation.

--The sewers proposed for residential areas are not cost-effective. On-site system rehabilitation in problem areas is recommended, and would be eligible for funding.

--A sewer to serve the commercial Route 28 strip is necessary and cost-effective. The projected plan is approximately 0.5 MGD.

--Of the three alternative sites considered in the original engineering plan, A and C would be hydrologically acceptable but are upgradient of existing and future water supplies. Advanced wastewater treatment may be necessary to dishcarge in these areas. Site B is too small.

--The purifax process would need to be re-evaluated because of hazardous by-products. Combined treatment of septage and sewage is preferable.

--Regionalization with Barnstable, (i.e. purchase of capacity at the Barnstable treatment plant) is desirable.

It is recommended that the town immediately investigate the possibilities for regionalization with Barnstable. A separate septage facility would then be necessary, and regionalization with Dennis should be considered. The town's attention is called to the section of this plan dealing with "septage treatment and disposal." Composting is the recommended process for separate septage facilities. The rehabilitation of the railroads currently underway could make importation of sawdust for a compost facility feasible if local sources of woodchips and sawdust are not adequate.

If regionalization with Barnstable is not politically feasible, the next best alternative under the 208 criteria is use of Site D for spray/irrigation or overland flow. The lagoon treatment process proposed by the EIS to precede spray irrigation has several important advantages over other methods. It is easy to operate and maintain and produce almost no sludge. The spray irrigation or overland flow would not threaten any public wells and meets 208 criteria as the preferred method.

The town has been cautioned that use of Site D requires further investigation, and that it would not be able to handle flows from any additional source areas. It has been suggested, however, that a recent proposal for a golf course in an adjacent area could provide for future expansion since the spray irrigation process could be used to maintain the golf course. EPA policies strongly favor wastewater management services that enhance recreational opportunities for the community. Other expansion irrigation sites should also be investigated, including existing golf courses, power line easements and Site A.

Whether the town proceeds with Barnstable or site D, however, it must be aware that both of these alternatives are feasible only because the EIS is considering a very limited sewering program. Aggressive efforts to upgrade and maintain on-site systems will be necessary if creation of new sewer needs is to be avoided.

Without Barnstable and Site D the town may be faced with very expensive options, involving advanced waste treatment. It is not likely that either site is large enough for a treatment plant and spray irrigation with suitable buffers. If further evaluation reveals that physical/chemical treatment is necessary, the state and EPA should support it with full funding.

On-Site System Management

The town has a full-time professional health agent who is already implementing many of the 208 recommendations on on-site system management. Upgrading of on-site systems south of Route 28 prior to conversion to year-round uses should be a priority. As soon as construction of the sewage/septage facilities is underway, the town should begin setting up a mandatory on-site system pumping program.

Another concern for on-site system management is the hilly terrain and wet soils in the northern sections of the town, presenting moderate to severe limitations on on-site system uses. Non-structural controls, including control of multi-family dwellings and possibly larger lot zoning, could help to prevent the development of serious problems. The health agent should advise the planning board in implementing such recommendations.

Water Supply Protection

There has been considerable activity recently in the town regarding water supply protection. The water department is working on implementing a 208 Watershed Protection District bylaw, and the planning board is currently preparing a major zoning change to reduce densities in the vicinity of existing and potential wellfields. CCPEDC will work closely with the town in effecting immediate controls.

Water quality monitoring and plume location at the landfill site are also essential, since the landfill is potentially upgradient of wells 10 and 11. Further cooperation from the state DPW will also be necessary to resolve sodium problems in wells #1, 2 and 3 near the Union Street exit from Rte. 6. The town is referred to the water supply discussions in the body of the plan. "Potential Water Supply Development Areas" appear to be limited in this town because of existing land uses. A total water supply management plan should be worked out through the efforts of the water quality advisory committee.

Water Quality Planning Coordination

The town has recently formed an Ad Hoc water quality advisory committee to review progress of the Environmental Impact Study and to help coordinate efforts to implement a watershed protection areas bylaw.

Land Use and Growth Control

The town will have to face growth control issues in the implementation of its sewer construction project and water quality planning efforts. If limited sewage treatment and disposal capacities are available, the town will have to pass special bylaws to control the rate of hook-up and to allocate capacities to abutters. Stringent measures should be taken in other parts of the town to avoid the development of sewer needs.

The planning board is proposing to eliminate the grandfather clause on substandard lots south of Route 28, and should also consider a "Seasonal Residential District" overlay to control conversions. (Please see "Land Use Control" section.) Whether or not growth rate controls will be necessary to ensure a protected water supply will need further investigation in the water quality planning process.

Public Participation

4

Draft Plan Review Process

Draft Plan Review Process

A detailed discussion of the 208 public participation program, presented in Appendix A of the Draft Plan reviews the means used to encourage public participation during the preparation of the draft plan and how this participation affected the development of the draft plan. Since publication of the draft plan in May 1978, formal public review has involved citizens and officials in every Cape town in an intensive effort to obtain detailed and thorough comments on the draft recommendations.

In May, the CCPEDC requested that a 208 Draft Plan Review Committee be established in every town. The committee was to be composed of the CCPEDC member or alternate, APAC member, a member of the board of selectmen and other appropriate town boards chosen by the selectmen. It was suggested that a member of the planning board, conservation commission, water commissioners, board of health, department of public works or sewer commissioners be included. Thirteen of the fifteen towns organized such a Draft Plan Review Committee. In certain towns membership was limited and the committee only met once or twice. Mashpee and Wellfleet did not have active review committees. Most of the committees carried out a careful review of the draft plan and evaluated the impact of the draft recommendations on their town.

The 208 staff stressed the importance of the committee's considering whether each management recommendation would be supported in their town and if not, what changes might be made to improve the recommendation. A member of the 208 staff met with each of the organized committees at least once during the review period to answer questions and to provide guidance for their review.

The 208 staff also provided the committees with a questionnaire on the draft plan to assist them in providing detailed responses to the draft recommendations. Most of the committees chose to fill out the questionnaire, others provided separate comments. The chart that follows indicates how many times the committee met, whether a local public meeting was sponsored by the committee and whether the questionnaire or comments were submitted by the committee or by a committee representative(s). A list of the committee members by town follows the chart.

While the staff believes the questionnaires were helpful in eliciting comments from most towns, many of the comments discussed at the committee meetings (in the presence of 208 staff) were not included when the groups completed the questionnaires. Emphasis of concern or support by the group members was also lost in the questionnaire results. However, a general impression of the committees' concerns is shown in the questionnaire results presented in Volume 2 of the final plan. The 208 staff was very gratified by the responsiveness of public officials in carrying out the review of the draft plan.

In addition to the work of the draft plan review committees, the 208 staff held three public meetings during the public review period, which was formally closed on July 20, 1978. The first two introductory meetings were held in Orleans on May 30, 1978 for the lower Cape and in Barnstable on June 1, 1978 for the mid and upper Cape. A final public meeting was held to review public comments in Dennis on June 28, 1978.

TABLE 4.1

DRAFT PLAN REVIEW COMMITTEES

Town	Committee Formed	Times Met	Questionnaire Submitted by Committee	Questionnaire Submitted by Representative or Separate Members	Comments Submitted by Committee	Local Public Meeting Held
BA	X	2		X		X
BO	X	4	X			
BR	X	3	X			
CH	X	2	X		X	X
DE	X	5	X			X
EA	X	3	X			X
FA	X	4 or 5			X	
HA	X	5				X
MA						
OR	X	3	X			X
PR	X	1	X			
SA	X	2		X		X
TR	X	2 or 3	X			X
WE						
YA	X	3		X		X

DRAFT PLAN REVIEW COMMITTEE MEMBERS

BARNSTABLE

Dorothy Donaldson	CCPEDC
John Kelly	Health Agent
Abraham Michaels	DPW Superintendent
Mary Montagna	Board of Selectmen Chairman
Tom Mullen	Barnstable Fire & Water District Superintendent, APAC
Ed Murphy	Planning Board
Lester Sherman	Water Pollution Control Board Chairman
Ed Taylor	Board of Selectmen
Arlene Wilson	Conservation Commission Chairman

BOURNE

Edward Brady	Planning Board Chairman, APAC
Rev. Philip Jacobs	CCPEDC
Barry Johnson	Board of Selectmen Chairman
Robert Kildoff	Finance Committee Chairman
Ted Linhares	Bourne Water District Superintendent
Christopher O'Donnell	CCPEDC
Peter Richter	Board of Health Chairman

BREWSTER

William Craig	CCPEDC
Bob Finch	Former Conservation Commission
Chester Majewski	Health Agent
Chauncey Reed	Planning Board, APAC
Jane Wagner	Civic Action Group

CHATHAM

W. Applegate	Water Pollution Control Board
Thorne W. Campbell	Board of Selectmen
George Collins	Water Pollution Control Board
Wilfred Goodridge	Planning Board, APAC
Edward T. Harrington	Board of Selectmen Chairman
Charles Mitchell	Health Agent
Thomas Pennypacker II	Board of Selectmen
Woodman Perine	Natural Resources Advisory Committee
Joyce Thompson	Conservation Commission, APAC
Arthur Villepique	Natural Resources Advisory Committee

DENNIS

Al Andrews	Water District Engineer
Constance Bechard	Planning Board Chairman
Theodore Dumas	Health Director
Curt Livingston	Conservation Commission Chairman
Don Moncevicz	APAC
Paul True	Water Commissioner

EASTHAM

John Alexander	Building Inspector/Health Agent
Margaret Collins	Conservation Commission
Henry Lind	Natural Resources Agent
Jackson Nelson	Board of Health Chairman
Richard Nickerson	Planning Board Chairman
Wallace Ruckert	Board of Selectmen
Donald Sander	Dump Study Committee
Laura Underhill	Board of Selectmen Chairman
Herbert Whitlock	APCC--interested citizen

FALMOUTH

Richard Bennett	DPW Commissioner
Leonard Costa	Health Agent
George Hampson	Planning Board Chairman
Bill Lisky	CCPEDC
Heather McMurtrie	Board of Selectmen Chairman
Fred Turkington	Growth Policy Committee Chairman
Virginia Valiela	Recycling and Disposal Committee
Richard Witt	DPW Superintendent .
Harold Zinn	Conservation Commission

HARWICH

Dr. Carl Clapp	APAC
Norman Clarke	interested citizen
Haydn Greenhalgh	Board of Selectmen
Irving Lightbaum	Interested citizen
David Thyng	Building Inspector/Health Agent

ORLEANS

Paul Daniels	Cesspool pumper
Charles Darling	Finance Committee Chairman
William Holland	APAC
Sandra Libby	Asst. Shellfish Warden
Tom Nickerson	Board of Selectmen
Lauren Peterson	Water Superintendent
C. Francis Richardson	Water Commissioner
Edward Rohmer	Planning Board Chairman

PROVINCETOWN

Eileen Andrews	Health Agent
Charles Cobb	Town Manager
Tom Higley	Planning Board
Page McMahon	Water Commissioner
Jeff Parker	Grant Coordinator

SANDWICH

Chester Cross	Planning Board Chairman
Robert Ellis	Board of Health Chairman
J. Louis Roberti	Board of Selectmen Chairman
William Taylor	Town Engineer
William Thompson	CCPEDC
Albert Torrey	Conservation Commission
Norman Welch	Housing Authority Chairman

TRURO

Emmons Brown	Planning Board Chairman
Steve Burke	Conservation Commission
Louis Chiampa	Building Inspector/Health Agent
Dr. Charles Davidson	Conservation Commission Chairman
Rachael Giese	Conservation Commission
Edward Oswalt	Board of Selectmen Chairman
Albert Silva	Beach Point Property Owners Assn. Chairman

YARMOUTH

Roger Edwards	Water Commissioner
Charlotte Ellis	Planning Board
Dale Karnes	Health Agent
Thomas Kelly	CCPEDC, Water Commissioner, APAC
Luther Long	Yarmouth Taxpayers Assn.
Harry Schroeder	Yarmouth Taxpayers Assn.

Unfortunately, this final meeting was premature, since it had been scheduled prior to mailing the draft plans and there was a delay in the mailing. Therefore, the announcement of the 45-day review period in the Federal Register was published later than anticipated. Many of the committees had not completed their review at this early time. In addition to the meetings with the review committees, the staff also met with interested organizations during the review period including the associated boards of health, the Yarmouth Taxpayers Association and the Outer Cape Environmental Association.

Four hundred copies of the draft plan were printed and approximately 225 were available for use on the Cape. The remaining 175 copies were used for review by Federal and State agencies. Each town received 6-8 copies of the draft plan for use by the review committees. Copies were sent to each Cape Cod Library for public use. Lending copies were also maintained at the CCPEDC office and were in considerable demand throughout the review period.

A summary of the draft plan in newspaper form was also published (3,000 copies) and distributed by mail to the 500 interested citizens on the 208 newsletter mailing list, at public meetings, at town halls and other public places and through interested citizen groups. This summary was very well received and proved very helpful in bringing information about the draft plan to a broad range of citizens. Substantial media exposure was given to the draft plan, Local Draft Plan Review Committees and the public meetings on the draft plan throughout the review period. A file of newspaper clippings on the draft plan review period is maintained at the CCPEDC office.

Through these various efforts, a number of interested citizens outside of the formal review committees, were encouraged to review the draft plan and made their own comments, presented in the Volume 2 "Public Comments and Responses." This volume includes comments by individuals, local review committees, interested organizations, regional, state and federal agency personnel. Responses to these comments indicate specifically how the 208 staff has modified the plan to incorporate suggested changes or additions.

During the review period, particularly at the public and committee meetings, comments were largely supportive of the major directions and recommendations presented in the draft plan. Many individuals commented that they felt the plan was very comprehensive and believed that the major thrusts of the plan--to protect critical water resources and to improve on-site system management--were very valuable and appropriate for Cape Cod.

Many citizens also commented that the plan needed to include further information in three main areas: road salt application and storage, water conservation and gas and oil storage. In addition, further details were requested in the area of on-site system maintenance, septage and sludge disposal. The final plan has included considerably more information and more specific recommendations in these areas in response to the concerns voiced by citizens during the review period.

Public participation in the preparation of both the draft and final plans has been invaluable in developing recommendations that are meaningful and implementable. Throughout the planning process involved citizens provided needed local information, valuable technical expertise, and insights into whether a particular approach will be acceptable to other citizens. They helped to broaden concerns, focus attention on specific problems, and resolve conflicts. These valuable contributions have been the basis of the final plan recommendations and must be a continuing asset as the 208 program enters its implementation phase.

As suggested in the draft plan, it is the recommendation of the final plan, that a permanent Water Resources Advisory Council be established. The Advisory Council would be advisory to the Cape Cod Planning and Economic Development Commission and would be comprised of a member from each Cape Cod town named by the board of selectmen (or the Water Quality Advisory Committee). Town members should be knowledgeable of the water quality problems of the town and preferably be a member of a town board responsible for water quality related matters. Other regional organizations could also serve on the Water Resources Advisory Council at the request of the CCPEDC. The following regional organizations are suggested for inclusion on the Water Resources Advisory Council:

Associated Boards of Health
Association for the Preservation of Cape Cod
Cape Cod Association of Professional Engineers
Cape Cod Builders & Contractors
Cape Cod Chamber of Commerce
Massachusetts League of Women Voters, Cape Cod Chapters
(one member chosen)
Region VII Planning Boards

Other regional, state and federal agencies and organizations may also be requested to serve in an advisory capacity by CCPEDC:

Barnstable Conservation District
Barnstable County Extension Service
Barnstable County Health Department
Cape Cod National Seashore
Environmental Defense Fund
Massachusetts Department of Environmental Quality Engineering
Massachusetts Department of Water Pollution Control
U.S. Environmental Protection Agency
U.S. Geological Survey
U.S. Soil Conservation Service
Woods Hole Oceanographic Institute

Appendices

APPENDIX A

DRAFT PLAN ERRATA SHEET

Page		Correction
2-1	Para 2, sentence 2	Change to: "Cape Cod is a peninsula extending 40 miles seaward from the coast of Massachusetts."
2-4	Para 2, sentence 1	Change to: "The remainder of the Cape is characterized by coarse sands, some tidal marsh, peat areas, and occasional slowly permeable glacial till." Add the following sentence after sentence #1: "There are some areas of consolidated glacial till referred to as fragipan."
	Para 3 & 4	Should be replaced by the following: "The general soil associations found on the Cape are Carver-Muck-Hinckley which are found in the outwash plain from Bourne and Falmouth to Harwich and Brewster; Canton-Plymouth-Carver found in moraine areas from Falmouth to Brewster. The lower Cape from Chatham to Truro are characterized by Dukes-Carver-Tidal Marsh and Provincetown is Dune Land-Tidal Marsh-Beach (USDA, SCS, 1978). "Nine of the fifteen towns have detailed soil surveys prepared by the Soil Conservation Service. These surveys provide soil data for only the upper three feet of soil and with the scale of these maps, it is not possible to delineate areas smaller than about 4 acres. While these maps are not an accurate indication of whether a particular lot is suitable for on-site disposal, they do provide a general indication of soil suitability for on-lot wastewater disposal to assist in general planning purposes. Combined with soil information gathered by the health agent in conducting soil tests under Title 5, these maps can be useful to the town in determining the need for limiting lot sizes and for using special care in the enforcement of Title 5 within these areas. See Appendix L, "Guidelines for Lot Size Determinations for Single Family Dwellings" in the SCS publication, Guidelines for Soil and Water Conservation in Urbanizing Areas of Massachusetts, 1975.

Page		Correction
2-10	Para 3, sentence 1	Chatham fishing fleet is anchored in Aunt Lydia's Cove, not Stage Harbor.
3-28	Map Symbol of chlorophyll-a concentrations	The symbol for the third category, "Noticeable Enrichment," should be a ▲
3-45	(In response to Esther Snyder's comment)	Add asterisk (*) beside 4 (x)'s indicating presence of phthalate compounds in Woods Hole effluent. Add explanation: "The use of plastic tubing could not be avoided during sampling of the groundwater percolate at Woods Hole, which probably explains the appearance of these (phthalate) compounds." (Slimak & Harris, 1977)
3-50	Line 17	Observed Coliform Concentrations in Falmouth Inner Harbor--Add reference: From: Division of Water Pollution Control, (1976).
3-51	Para 2, line 6	Correct table number is 3.14.
	Para 4, line 5-7	Insert observation well numbers: (1) far downgradient of existing landfill, (3,4,5) in old landfill, (6) immediately downgradient of existing landfill, (7,8) downflow of septage pits, (9) upflow of present landfill.
	Para 5, line 4	Should read: 35.5 to 532.5 mg/l chloride (Cl-), 79.8 to 362 mg/l sodium (Na+)...
3-53	Table misnumbered.	"Leachate Characteristics" should be #3.14. The correct Table 3.13, "Calculation of Mean Concentrations in Runoff and Harbor Water after a Standard Storm" is included in this errata section.
	Table 3.14	"Leachate Characteristics" should be corrected in the following ways: --all decimals in columns (3) "Average Value" and (4) "Maximum Value" should be replaced with commas. --the note should read "All data (with the exception of pH values) are in milligrams per liter.

Page		Correction
3-54	Table misnumbered.	"Concentration of Constituents in Well Samples at Dennis Landfill" should be #3.15.
		Correct Sample Numbers should be: 1,3,4, 5,6,7,8,9; there is no # 2 or 10.
		"Modal Ranges or Mean" for N/NO is (.04-.22).
		Add footnote: Well Positions: (1) far downgradient of existing landfill. (3,4,5) in old landfill. (6) immediately downgradient of existing landfill. (7,8) downflow of septage pits, (9) upflow of present landfill.
5-37	#3 should be changed as follows:	3. Towns will implement overall density requirements of one dwelling unit per 40,000 to 60,000 sq. ft. in all public water supply recharge areas.
	#4 should be changed as follows:	4. Towns will implement density requirements of one dwelling unit per 40,000 sq. ft. in all areas relying on private wells, around and upgradient of ponds and coastal embayments.
	#8 should be changed as follows:	8. Towns may wish to prohibit construction of buildings in environmentally critical areas even when sewer service may be available.
7-15	Para 1, line 8	The word "favorable" should be changed to "foreseeable."

TABLE 3.13

CALCULATION OF MEAN CONCENTRATIONS IN RUNOFF AND HARBOR WATER AFTER A STANDARD STORM

Based on National Means Standards By Amy, et al (1974)

Total dry solids per curb mile per day: 74 lb. (33.5 kg)

Total curb mileage in Falmouth Inner Harbor storm drainage basin: 2.13 Mi.

Mean interval between storms: 3.23 days

Stormwater Constituents	National Mean Concentrations for Commercial Land Use (mg/kg dry solid)	FALMOUTH STORM LOADING CONCENTRATIONS: Load Level in Mean Storm (gm)	Load Concentrations in Stormwater (mg/l)	After Harbor Seawater Dilution (mg/l)	LOCAL OBSERVED CONCENTRATIONS: Hyannis Catch Basins (mg/l)		
BOD_5	58,700	13,559	23	.03	--	--	--
COD	269,000	62,139	107	.12	--	--	--
PO_4	1,280	296	.51	.0006	.025	.057	.048
NO_3	1,580	364	.63	.0006	.300	12.5	1.05
NH_4	2,640	609	1.05	.001	.571	.556	.741
Cd	3.4	.78	.001	ins*	--	--	--
Cr	211	48	.08	ins*	.001	.001	.002
Cu	104	24	.04	ins*	--	--	--
Fe	22,000	5,084	8.78	.010	--	.120	.110
Pb	3,440	794	1.37	.002	.019	.045	.055
Mn	418	96	.17	ins*	--	--	--
Ni	35	8	.01	ins*	--	--	--
Zn	520	120	.21	ins*	--	--	--
Total Coliform	2.5×10^6	5.7×10^5	9.8×10^2	1.0	--	--	--
Fecal Coliform	1.7×10^5	3.9×10^4	6.7×10^1	ins*	--	--	--

*ins = insignificant

APPENDIX B

MODEL DEVELOPMENT SCHEDULING BYLAW

Development Scheduling

The Building Inspector shall issue building permits for construction of new dwelling units in subdivisions or multi-family structures approved after_____, or occupancy permits for initial use of plots in a mobile home park approved after_____, only under one or more of the following circumstances:

a. Permit issuance will not result in more than_____dwelling units or mobile home plots having been authorized* within a twenty-four month period for that development and for developments on contiguous land which has been in the same ownership at any time subsequent to July 1, 1977.

b. Permit issuance will not result in more than_____percent of the dwelling units or mobile home plots potentially allowed in the subdivision, multi-family development, or mobile home park having been authorized* within a twenty-four month period.

c. Permit issuance will not result in more than_____new dwelling units plus mobile home plots having been authorized* townwide within a twenty-four month period.

d. Permit issuance is for a subdivision lot exempted from these requirements. A lot becomes exempted from these requirements on the date so designated for the lot on a development schedule, if any, which has been approved by the Planning Board and recorded with the subdivision plan which created the lot. Planning Board approval of a development schedule shall be granted provided that (1) the schedule exempts not more than _____% of the potential dwelling units in the subdivision within the first two years following definitive plan endorsement, (2) in each year thereafter, the schedule adds to the exempted category not more than _____% of the total number of potential dwelling units in the subdivision and (3) in the opinion of the Planning Board, the development sequence established by the schedule is not arbitrary or unreasonable. A lot may also be exempted from these requirements if the Planning Board, after consulting with the Housing Authority, grants a Special Permit upon its determination that such exemption is essential to the feasibility of a development which serves salient local housing needs and is to be subsidized under a state or federal program for low or moderate-income housing.

*exclusive of unutilized authorizations which have lapsed or have been withdrawn.

APPENDIX C

EARTH REMOVAL BYLAW

Mansfield, Mass.

In Agriculture, Business A Business B Business C and Industrial Districts earth removal, which shall mean the transfer of quarried stone, stone, and gravel or loam from one parcel of property to another, is permitted as a special permit by the Board of Appeals subject to the following conditions:

1. A duly submitted application for said special permit shall be comprised of the following:

   a. Properly completed application form which shall include the following:

      i. Estimate of the quantity of gravel to be removed from the site.

      ii. Length of operation (give dates).

      iii. Proposed travel routes

      iv. Proposed daily hours of operation.

   b. A survey and engineering plan properly drawn, at a horizontal scale of 1" - 40', on tracing cloth by a Registered Professional Civil Engineer and Registered Professional Land Surveyor, four (4) copies of said plan shall be submitted to the Board of Appeals and shall include, but not be limited to, the following:

      i. A perimeter plan of the property showing the name of all immediate abuttors as taken from the most recent tax list and the name and address of the record owner.

      ii. Existing topography based on a current survey showing two foot contour intervals. Elevations should be related to the Mansfield Vertical Control System.

      iii. A lot of soil borings, the number of borings taken will vary with the size and geological make-up of the site, shall be a minimum of one (1) per acre. All borings shall be taken to a minimum depth of four (4) feet below the proposed finished grade.

      iv. A topographical map showing final grades and drainage facilities after excavation.

      v. All proposed entrance and exit roads.

      vi. Limits of excavation.

vii. Focus plan at a scale of [illegible]

[illegible] earth removal projects shall [illegible] conditional standards:

a. Excavation shall not be [illegible] (100) of the property line [illegible] and maintained [illegible] one [illegible] production purposes.

b. Operation hours, including [illegible] shall be only between [illegible] Monday through Friday and [illegible] premises only within [illegible] leaving said premises [illegible] Board of Appeals based on [illegible] conditions for the special [illegible] be greater than one every three [illegible] vehicles shall be suitably covered [illegible] dust and contents from spilling and blowing [illegible]

c. [illegible] earth removal operation [illegible] at any one [illegible] shall be restored in [illegible] operation on the [illegible] building [illegible]

d. [illegible] and load [illegible] of the [illegible] of Port [illegible]

[illegible] shall be [illegible] legible to the public way.

e. [illegible] ton per square yard. This application [illegible] distance of two hundred (200) feet [illegible]

g. The operator shall be responsible for daily cleaning of [illegible] age on public ways occuring as a result of [illegible]

h. No earth shall be removed within six [illegible] of seasonal high water table. This elevation [illegible] the borings shown on the topographic plan.

i. Limits of excavation shall be set by stakes located at intervals of one hundred (100) feet with a minimum of three (5) feet exposed. A vertical control monument shall be installed in a readily accessible location.

j. No area shall be excavated so as to cause accumulation of free standing water. Permanent drainage shall be provided as needed in accordance with good conservation practices. Drainage shall not lead directly into streams or ponds.

k. All topsoil and subsoil shall be stripped from the operation area and stock piled for use in restoring the area after the removal operation has ceased.

l. Any temporary shelters or buildings erected on the premises shall be screened from public view. These structures shall be removed from the premises within thirty (30) days after they are no longer needed.

m. No excavation shall be allowed closer than fifty (50) feet to a natural stream or body of water. Natural vegetation shall be left and maintained on the undisturbed land.

n. If at any time during the period of operation, any of the above standards are not being complied with, the Building Inspector shall issue a cease order.

3. All earth removal projects shall be subject to the following restoration standards:

a. No slope shall be left with a slope steeper than 4:1 (horizontal to vertical).

b. All debris, stumps, boulders, shall be disposed of in an approved location shown on the plan, buried and covered with a minimum of two (2) feet of soil.

c. Within thirty (30) days following excavation final grading shall be established as shown on the approved topographical plan.

d. Retained subsoil and topsoil shall be respread over the disturbed area to a minimum depth equivalent to the depth of topsoil on the site plan prior to the beginning of the operation as determined by the soil boring data, or to a depth of five (5) inches, which ever is less. This soil shall be treated with three (3) tons of lime per acre and 1,000 pounds of 10-10-10 fertilizer per acre and seeded with a grass or legume mixture prescribed by the Conservation Commission. Trees or shrubs of prescribed species will be planted in order to provide screening, natural beauty, and to reduce erosion. The planted area shall be protected from erosion during the establishment period using good conservation practices.

e. Upon completion of the operation, the land shall be left so the natural storm drainage leaves the property at the original natural storm drainage points and so that the area of drainage to any one point is not increased.

f. Within thirty (30) days after termination of gravel operations, all equipment, buildings, structures and unsightly evidence of operations shall be removed from the premises.

g. An "as built" plan, prepared by a Registered Professional Land Surveyor showing all finished grades, depth of loam, drainage facilities, location of buried debris, and states that the land conforms with the original plan shall be prepared and approved by the Building Inspector, prior to the release of the performance bond.

4. Special permit for earth removal may be issued for an initial one (1) year period. One (1) renewal permit may be issued without a new hearing for one (1) year period, based upon satisfactory performance of the provisions of the original permit. A performance bond in the amount of $3,000 shall be required for each acre on which the permit has been granted. This shall be released only after the land has been restored as outlined in paragraph 3.

5. No earth removal operation shall be allowed unless it meets the requirements as outlined above and a special permit has been granted by the Board of Appeals, and a building permit has been issued by the Building Inspector. Nothing herein contained, however, shall prohibit the removal of stone, sand, loam, or gravel in connection with the construction of a building for which a building permit has been duly issued, or for the landscaping of a lot from which said stone, sand, loam, or gravel is removed, provided that the Building Inspector has been informed in writing of the changes to be made together with an accurate description of the parcel of land under consideration. When granting permission for the removal of surplus material, the Building Inspector shall inform the applicant in writing.

a. The original and six (6) copies of the earth removal application shall be submitted to the Town Clerk, who shall give the applicant a dated receipt. Within three (3) days of receipt of said application the Town Clerk shall transmit the original and one (1) copy to the Board of Appeals and one (1) copy each to the Board of Health, Building Inspector, Planning Board and Conservation Commission.

The Board of Appeals shall hold a public hearing on said application. If the Board of Appeals determines that said earth removal application complies with the purpose and specifications of this bylaw it shall approve the application with or without conditions; if the plan does not comply with the specifications of this bylaw it shall be disapproved, or approved with conditions that bring about compliance.

The Board of Appeals shall take action on said application within sixty (60) days from the date of submission. Failure to act within sixty (60) days shall constitute approval. A building permit shall not be issued in a case requiring an earth removal permit unless approval has been obtained or the sixty (60) days has elapsed.

b. Following approval of the special permit by the Board of Appeals the applicant shall obtain a building permit from the Building Inspector.

APPENDIX D

SAMPLE DAILY GASOLINE INVENTORY RECORD

At least weekly, review the past week's daily inventory records.

A	B		C		D		E		F	G
Product	Opening Physical Inventory	-	Sales	+	Deliveries	=	Inventory Balance	-	Closing Physical Inventory	Over (Short)
TOTAL										

F

CLOSING INVENTORY STICK READINGS

Tank	Feet/Inches	Product	Gallons
1	/		
2	/		
3	/		
4	/		

Initialed by _____

Date _____

NOTE: FORWARD CLOSING PHYSICAL INVENTORY F TO OPENING PHYSICAL INVENTORY B ON NEXT DAY'S RECORD.

Source: Recommended Practice for Bulk Liquid Stock Control at Retail Outlets, American Petroleum Institute, 1977.

APPENDIX E

EXCERPTS FROM THE FAIRFAX COUNTY PLUMBING CODE

Section 65-2-9

Water Conservation

In all new construction and in all repair and/or replacement of fixtures or trim, only fixtures and trim not exceeding the following flow rates and/or water usage shall be installed. These rates are based on a pressure at the fixture of 40 to 50 psi.

Water closets, tank type	3.5 gal. per flush
Water closets, flushometer type	3.0 gal. per flush
Urinals, tank type	3.0 gal. per flush
Urinals, flushometer type	3.0 gal. per flush
Shower Heads	3.0 GPM
Lavatory, sink faucets	4.0 GPM

Lavatories for Public Use: Faucets of lavatories located in rest rooms intended for public use shall be of the metering, or self-closing type.

Section 65-2-10

Car Wash Installations

(a) Car wash installations shall be equipped with a recycling system approved by the Administrative Authority.

Source: Massachusetts Conference on Water Conservation, 1977.

APPENDIX F

BIBLIOGRAPHY

The following additional publications were used to prepare the final plan:

American Petroleum Institute, 1977. Recommended Practice for Bulk Liquid Stock Control at Retail Outlets, Washington, D.C.

Massachusetts Executive Office of Environmental Affairs, 1978. Massachusetts Water Supply Policy Statement, Boston.

National Fire Protection Association, 1972. Underground Leakage of Flammable & Combustible Liquids, NFPA No. 329, Boston.

U.S. Department of Agriculture, Soil Conservation Service, 1978. Water and Related Land Resources of the Coastal Region, Massachusetts, Boston.

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78/1

FINAL
v. 2

Water Quality Management Plan/EIS For Cape Cod

Volume 2

Final Plan /
Environmental Impact Statement

September 1978

GOVERNMENT DOCUMENTS
DEPARTMENT
BOSTON PUBLIC LIBRARY

ENVIRONMENTAL IMPACT STATEMENT

and

208 WATER QUALITY MANAGEMENT PLAN

for

CAPE COD

VOLUME 2

Prepared by:

CAPE COD PLANNING AND ECONOMIC DEVELOPMENT COMMISSION

First District Court House

Barnstable, Massachusetts 02630

September 1978

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region 1

J.F.K. Federal Building

Boston, Massachusetts 02203

Responsible Officials:

William R. Adams, Jr.
Regional Administrator
EPA - Region 1

Alfred S. DeMott, Chairman
Cape Cod Planning and Economic
Development Commission

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Introduction

Following publication of the Draft Water Quality Management Plan/EIS for Cape Cod in May, EPA and CCPEDC sponsored a formal 45-day public review period. Interested citizens and officials were asked to present written comments on the draft plan during this period which was formally closed on July 20, 1978. Many individuals, public officials and members of Local Draft Plan Review Committees attended meetings to discuss the draft plan recommendations and, after reviewing the draft plan, provided the comments that are presented in this volume of the Final Water Quality Management Plan/EIS for Cape Cod.

All written comments submitted by citizens, local boards, citizen organizations, regional, state and federal agencies have been reproduced in full. Responses to these comments have also been prepared by the 208 planning staff and are presented in this volume. Each comment that required a response has been numbered and the staff response has been numbered correspondingly.

Public comments are presented first, followed by state and federal agency comments. Individual comments are presented under the name of the individual who signed the comments (in alphabetical order). Town board comments are presented in alphabetical order by town. State and federal agency comments are presented in alphabetical order by agency. Staff responses to these comments follow these sections.

The comments submitted by the Local Draft Plan Review Committees in response to the questionnaire have been compiled so that each town may compare its comments to those of the other towns. This summary of the local committees questionnaire responses follows all other comments and staff responses. In most cases, the questionnaire submitted, was completed by the committee meeting as a group. However, in the case of Barnstable and Yarmouth, the committee members chose to fill out their answers individually. Since there is no adequate means of compiling these comments as a joint town response, the individual comments have been included in this compilation. Also, in the case of Sandwich, the committee did not fill out the questionnaire as a group but requested one member to submit a completed questionnaire on behalf of the group.

All comments submitted prior to the publication of the final plan have been included in this volume but those submitted after September 1 did not provide adequate time for staff response. Any enclosures that accompanied comment letters have not been reproduced in the final plan but are available for review at the CCPEDC office.

As indicated in the Public Participation section of Volume 1, the staff has worked to incorporate the suggestions and comments submitted by the public into the recommendations of the final plan. The responses to the public comments specifically indicate how the comments were accommodated. In certain instances, the staff has determined that the change requested is not warranted. In some cases, the change was not significant to the overall intent of the plan; in others, the staff differs with the opinion offered in the comment; and finally, there is not sufficient general support to make such a change at the present time.

Public Comments

Citizens and Organizations

State Agencies

Federal Agencies

JULIET R. BERNSTEIN
78 CHIPPING STONE RD.
CHATHAM, MASS. 02633

JUL 25 1978

July 24, 1978

Mrs. Sylvia Daniels
Cape Cod Planning & Economic Development Commission
1st. District Court House
Barnstable, Mass. 02630

Dear Sylvia:

I am sorry to be so late in making my personal comments regarding the Draft Wastewater Management Program, so ably presented by Paula Magnusen and you at the regional meeting in Orleans and the local meeting in Chatham early in June. I am sorry that the one in Chatham was so poorly attended--an indication that the general public is either not aware, or else not concerned, about water management in our towns.

I think that both you and Paula did a fine job in organizing the meetings and answering all questions. I was most impressed.

I went through the first half of the Draft Plan very carefully, making notes as I went along, but did not complete the second half as carefully, as I had to return the report to the library(I had had it long enough!). Although the plan is technical in many parts, I believe it is easily understood by the ordinary citizen, as I consider myself.

Just a minor point: the Chatham fishing fleet is anchored in Aunt Lydia's Cove, rather than Stage Harbor(see page 2-10). 1

The report commends Chatham for its forward-looking approach in having had a study of its water system by Metcalf and Eddy several years ago. I read this report. The town did follow one of the recommendations when it purchased a green area to protect our water system.

A matter of concern to me is that the Chatham Water Company is privately owned--one of the few, if not the only one on Cape Cod. As part of its water management program, the town should take over the company. Water supply is a public concern.

Because of Chatham's unique position on the Cape, there is not too much land area. Too much of it is being developed without regard to the problems that overdevelopment can create. As an observer at Chatham Planning Board meetings I was appalled at the number of subdivisions--many in the R10 South Chatham area. It is true that we somewhat rectified this zoning so that it is R15 in many cases(because of the need to place cesspools 100 feet from wells on the same or adjoining lots). However, I think greater attention should be paid to zoning to prevent water contamination. Too great a density--in summer as well as winter--can create problems.

Frostfish Creek is mentioned as polluted. Could not the Acme Laundry, located near the Creek, be a possible source of contamination--and could not some controls be made to prevent such pollution? 2

White and School House Ponds are said to have not enough oxygen in the winter to support aquatic life. How can this be corrected? 3

Goose, Stillwater and Mill Ponds are said to have colifarm bacteria exceeding limits during the winter months--much from septic tanks. Could a program requiring all homeowners to have their cesspools or septic tanks maintained and pumped on a regular basis every three years solve this problem? 4

Run-off from street is said to be a greater polluting factor(page 3-43) than raw sewage, that toxic and carcinogenic materials are found in the run-off. Could not an areawide program limiting the use of salt in removing snow be instituted? 5

If garbage disposal units(page 4-10) increase organic loading of the water, could there not be a limit--or perhaps outright prevention --of the use of such units? 6

Could there be an area requirement that all homes install water conservation devices to cut down on use of water in flushing toilets or other uses? 7

The report states that there are several problem areas in Chatham that must be corrected with preventive measures immediately. There is always opposition to spending money for prevention. What is needed is a broad educational program to inform the public of the need for conserving and protecting our water. Too few people attend public hearings. There must be some other way to reach them.

Sincerely,

Juliet R. Bernstein

"208" Hearing

The E.I.S. should be considered by the town of Barnstable as a new textbook on proper land use, and as a tool for good planning. The Planning Board, the Sewer Commission, the Board of Health, and the Conservation Commission should accept, study, and refer to this document time and time again. The Environmental Impact Statement should be considered a "Bible".

I have picked out two basic thoughts on the Draft Plan:

1. The references in the book on the data of soils should be tied to the data in the booklet by the U.S.D.A, "Soils and their Interpretations for Various Land Uses", and "Guidelines for Soil and Water Conservation in an Urbanizing Area of Mass.", by the U.S.D.A., Soil Conservation Service. In other words, information as to the soil restrictions of each type of soil on the Cape, (Carver, Belgrade, Gloucester, etc.) should be in the text of the E.I.S. and its appendix. 1
2. Marine sanitation devices must be placed upon boats on the Cape which have living quarters and heads. See PL 92-500, Title II, Section 312. Part of Marraspin Creek in Barnstable is polluted by lack of such devices.

Scott Edwards

OFFICE OF

SELECTMEN - ASSESSORS

BOARD OF HEALTH

ORLEANS, MASSACHUSETTS

Re: 208 Plan

HERBERT F. WILCOX
[illegible]
GASTON L. NORGEOT

May 23, 1978

Cape Cod Planning & Economic Development Commission
Court House
Barnstable, Massachusetts 02630

Attention: Alfred S. DeMott

Gentlemen:

As Town Representative on the 208 APAC Committee, I personally would recommend approval of the 208 Plan as issued. We need to have an area-wide, united organization for our protection. In addition, if Federal and State Agencies are involved, a group representation can best cope with the labyrinth of bureaucracy.

This is not the time to consider further amendment and change the plans. This generally well-written and well laid-out document could serve as very satisfactory guidelines for the immediate future requirements.

As far as Orleans is concerned, the problem of initiating a meaningful and continuing program of on-site disposal up-date and maintenance is absolutely necessary. Equally important is starting toward a septage treatment system - preferably sub-regional. If we wait until the Federal and State Agencies complete their ponderous and wasteful time and money consuming studies, the cost of installation will be beyond anyone's means.

Very truly yours,

William E. Holland, 208 Representative

weh:ee

OFFICE OF

SELECTMEN - ASSESSORS

BOARD OF HEALTH

ORLEANS, MASSACHUSETTS

HERBERT F. WILCOX
[redacted]
GASTON L. NORGEOT
Thomas B. Nickerson

June 27, 1978

Cape Cod Planning & Economic Development Commission
208 Quality Management Plan
1st District Court House
Barnstable, Massachusetts 02630

Attention: Sylvia Daniels

Dear Ms. Daniels:

The following comments are presented from the Orleans Committee relative to input to the 208 draft. Some of the comments were covered in the Lower Cape Meeting and are simply re-emphasized.

1. Elimination of use of salt in road sanding. 1

2. Recommend 208 staff collect information on the maintenance of on-site disposal systems and particularly in the use of additives (value vs hazards). 2

3. To study the acceptability and feasibility of small localized waste treatment systems. 3

4. To study the feasibility of financial relief to individuals for up-dating defunct on-site systems - i.e. tax abatements, etc. 4

5. Financial and technical assistance in monitoring areas around town dumps. 5

6. Assist in control of storm runoffs to fresh and salt protected water. 6

For the Committee

William E. Holland

weh:ee

P. O. Box 928
Brewster, Mass. 02631
June 1, 1978

Roberts E. Robes
Executive Director
Cape Cod Planning and Economic Development Commission
1st District Court House
Barnstable, Mass., 02631

Dear Mr. Robes:

This is in response to your invitation at the public hearing in Orleans, May 30, 1978, for written comments on the Water Quality Management Plan / EIS for Cape Cod:

I read the whole document for the first time before the meeting and, in my judgment, it is an excellent, well-worked out plan. (I have some personal experience with development problems: Prior to coming to the Cape, I was with the World Bank for 27 years--as economist, Director of the Economics Department, and Director of the Economic Development Institute.) Water is probably the most crucial natural resource constraint on Cape Cod. If the Plan recommendations are carried out Cape Cod should be able to develop and at the same time maintain the quality of environment that attracted most of us here.

I have the following suggestions for your consideration in the re-draft of the Plan:

1. There should be more emphasis on encouraging water conservation through a proper structure of water use charges. (I found only one sentence in the whole report on this.) The amount of water a household uses determines the amount of waste water to be disposed of. There is a great deal of flexibility in the use of water and people respond to money incentives. The structure of water rates in most towns on the Cape is such that the price per unit goes down with increasing use. Proper conservation user charges would, on the contrary, provide for rates to go up with usage to encourage careful use of water and to discourage wasteful use. 1

As we heard, Orleans is seriously considering moving to conservation user charge pricing. Yarmouth, which already has such a structure for most of its water consumption, is considering applying it across the board, I have been informed by their Water Department. A recommendation in the Plan for a conservation user charge structure would be very helpful.

2. The thrust of the recommendations for the adoption of the Preventive Alternative in waste water management for most of the Cape is certainly right. However, to help convince homeowners of this, they should receive some help in making the necessary investments, e.g. in replacing a cesspool by a septic tank or adding a second leach facility. Since a substantial part of the benefits from this accrue to the community, there is a case for the community helping the individual either through subsidizing a part of the cost directly through a grant or indirectly through a low-interest long-term loan. It might be worth considering whether such a project for federal funding help could be prepared. 2

3. A minor point: there should be a statement how "summer resident" is defined in the statistics. (I found a footnote in one table only in this regard.) The peak number of summer residents present during the summer is useful to know. But to get an idea of the waste-water problem, perhaps you need something like the school system's "full-time student equivalent", 10 summer visitors each staying one week equal 1 "full-time summer resident equivalent" or 140 day-trippers equal 1 "full-time summer resident equivalent"? 3

Sincerely yours,

Andrew M. Kamarck

Andrew M. Kamarck

July 13, 1978

JUL 14 1978

208 Planning Staff
Cape Cod Planning and Economic Development Commission
Barnstable, Massachusetts 02630

Re: Draft Water Quality Management Plan/EIS for Cape Cod

Ladies and Gentlemen:

I have read the draft plan with great interest. Being a practicing hydrogeologist I have paid particular attention to the areas related to ground water and geology, and will primarily comment on those aspects. I shall comment mostly on matters of content as I understand this to be a draft, and I presume it will undergo the thorough editing and revision it obviously needs. I found Chapter 2, especially the section on ground water, particularly distressing for its lack of clarity and accuracy in expressing the concepts that are so basic to understanding the whole water resources situation on Cape Cod. The problems with this chapter are so general it is not feasible to make specific comments on most of them in this letter.

My specific criticisms by chapter, page, and paragraph follow:

Chapter	Page	Paragraph	Comment
2	1	2	The Cape only extends about 40 miles seaward from the mainland, certainly not 90. The whole peninsula is not 80 miles long.
2	1	7	The outwash plain extends to sea level at the south shore, and below sea level in Nantucket Sound.
2	4	1	Kettle hole is more than sufficient. Adding depression is redundant.
2	4	1	The correct term is water table. Omit ground.
2	7	2	It should be stated that the use of ponds for water supply is for practical purposes the same as using ground water. As you have said elsewhere most of the ponds exist because the depressions they are in intersect the water table.
3	1	4	Nitrate is a toxic what?

Chapter	Page	Paragraph	Comment	
3	1	7	I think agricultural fertilizers should not be ignored as a source of nitrate and phosphorous in ground water or surface water.	
3	13	1	The third sentence makes no sense.	
3	17	3	Nitrate Results. It is not correct to say "nitrate NO_3 - N". Either use the chemical symbols only, or write "nitrate nitrogen".	
3	20		Nitrate from sewage is also likely to be associated with some increase in chloride.	
3	20		The nitrate loading calculation also suffers from the fact that during much of the growing season evapotranspiration exceeds recharge. (Actually the plants intercept the infiltrating precipitation before it can become recharge.) Therefore, there is virtually no dilution during a significant part of the year. Also, recharge is irregular while sewage flow is fairly constant. However, I do not know a better method of approximating nitrate loading, and I am not suggesting abandonment of such calculations.	1
3	53	Table 3.13	Are some decimals not missing? Should some decimals present not be commas?	2
5	27	2	In Chapter 2, p. 2-5, you say 16" of recharge.	
5	27	2	I question the validity of this calculation. The area from which a well draws water is related to the characteristics of the aquifer and to the flow of water in the aquifer, not merely to precipitation around the well.	
5	27-29		There is a problem with your definition of recharge area. You really seem to be talking about a well's area of influence. Recharge area refers to the whole aquifer, not just to one well. This is nicely stated in Appendix F, which you should follow in rewriting this.	3
Appendix F			The definition of Water Supply Protection Areas is based on dubious assumptions. This may seem the most practical approach, but I think it will lead to a false sense of security by those who follow it without a full understanding of it.	4

Chapter	Page	Paragraph	Comment
Appendix G			Some of these definitions are very bad. Following are some better definitions and other suggestions for improvement:

Aquifer - a geologic formation that yields water to wells in sufficient quantity to be significant in water supply.

Fresh

Fresh/salt water interface - the boundary between salt water and fresh water.

It is not merely a hypothetical boundary, it really is one, whether sharp or diffuse. Also, the boundary makes no assumptions about anything. People discussing the interface make assumptions.

Hydraulic refers to water in general, not just to ground water.

Kettle - a depression in glacial deposits, such as outwash sand and gravel, created by the melting of a block of glacier ice that was wholly or partly buried in that deposit.

Kettle Pond - a pond occurring in a kettle.

Moraine - an accumulation of glacial deposits having a constructional topographic expression independent of the surface underneath it, and having been built by the direct action of glacier ice.

Ground Moraine - moraine having low relief without transverse linear features, and generally denoting accumulation beneath the glacier.

End Moraine - a ridgelike moraine built along the margin of a glacier.

Recharge Area - area contributing infiltration of rainfall to ground water.

Why limit it to wells?
I never heard it applied to surface water supply where the more or less equivalent concept is a water shed.

In your definition of zone of aeration it would be better to say "soil and rock" rather than "sand".

Chapter	Page	Paragraph	Comment
Appendix G			Definitions of mutagenic and teratogenic (used in Table 3.12) would be appropriate.

I think that this is a very good effort at making the public, and the public servants in particular, aware of the problems confronting Cape Cod -- the reasons for the problems and why they need solutions soon. It provides sufficient alternative actions that there is no excuse for the towns not to get moving in some direction. Although it is not perfect and may be rejected by some people, I think this is a very positive effort at getting some order and sense (even inter-town cooperation?) into protecting our water supply, handling our wastes, and controlling our growth. My main fear is that much effectiveness and credibility of this document will be lost if it does not receive the thorough editing and revision that it needs to make it a clear and understandable tool.

Thank you for this opportunity to comment.

Sincerely,

John A. Moser

115 Hallet Street
Yarmouth Port

JUL 2 7 1978

July 19, 1978

Board of Selectmen
Town of Barnstable
Hyannis, Ma. 02601

Dear Board Members:

It has been my pleasure to represent the Town of Barnstable on the 208 Waste Water Management Plan Advisory Committee. I can only hope that the communities of Barnstable County will take advantage of the information provided in the plan and take action on the majority of its recommendations.

Formulating the 208 plan for Barnstable County has been an interesting process, every step of the information gathering, engineering review, and items for plan inclusion, has been overseen by the general public as well as the 208 staff members.

Public participation in the plan, as described above, has resulted in a plan which I believe addresses the waste water management and water supply problems on Cape Cod in a realistic and objective manner.

Various segments of the Cape Cod community have been upset from time to time as the plan has evolved. Those groups were generally, from each end of the spectrum, i.e. environmentalists and developers, and if one has any faith in our democratic system of compromise, I suppose you would have to say, as a result, it is a good plan.

The program's title of Waste Water Management is sometimes misleading in that the Cape's severe sewage handling problems are limited to a few densely populated village centers and harbor areas. The more appropriate title is that used on the draft plan's cover, that of a Water Quality Management Plan.

The draft plan's title is much broader in scope, as well it should be, for the effects of waste water on Cape Cod are somewhat elusive. Their long term effects on the Cape's environmental and economic future can be crippling, if proper measures are not taken in the very near future.

Strong leadership in each community will be required to achieve the balance necessary to assure environmental stability, and sound economic growth for our County.

Barnstable's unusual circumstance of having four separate water departments all outside the Town government, as well as a lack of a central authority within the municipal government, makes this communities' job harder than most. The need for persuasive leadership on the part of the Board of Selectment is going to be of prime importance if our towns healthy future is to be assured.

The recent charter change placing several important departments under one leadership, that of the D.P.W., should make the accomplishment of needed changes and improvements a simpler task.

If there is one negative comment I would make in the draft plan in your possession is that it does not go far enough. There is much more work to be accomplished, more specific information should be obtained for the Town of Barnstable. It wasn't possible to accomplish this with the limited funds available. The County program has provided a common base for all the communities to work from, and it is their responsibility to finish the job which the 208 program has begun.

The following items would seem to deserve immediate attention.

The County Health Department has done an admirable job, along with the Town sanitarians and health agents in handling problems at specific sites. They do not, however, have the time, personnel or expertise to establish and maintain an effective ground water monitoring programs. All of the towns should support the establishment of personnel, at the County level, to perform that function, as described in the draft plan.

One of the main objectives all towns should be aiming for is the identification of potential and current major pollutant sources. For example, dumps, landfills and sewerage treatment facilities should have their effluent plumes defined and monitored on a continuous basis.

Barnstable should follow Falmouth's good example and establish Public Water Supply Protection areas where appropriate. There is a model of such by-law at the end of the 208 Draft F.I.S.

The need for additional personnel for monitoring residential septic system maintenance is essential. This could probably be done most efficiently at the County level where one person could handle several towns.

By nature I do not like to see the expansion of government, and the establishment of new governmental branches or layers. The problem of maintaining an adequate and relatively clean water supply on the Cape is of such major proportions, hoever, that I believe a new agency should be established, solely, for that purpose.

A Barnstable County Water Supply Authority should be established. Its function would be to register and control every public water supply facility, as regards withdrawal rate, length of pumping days per well, etc. The monitoring of potential pollutants from developments, highways, and business would be their responsibility.

Those wells of significant capacity, say over 50,000 G.P.D., in addition to public water supply wells, should be permitted by the authority and their

pumping rates controlled by the Authority.

Should the Board care to discuss these matters at length some time, I am at your disposal.

Very truly yours,

_____
Thomas J. Mullen, Supt. of Water Dept.
208 Waste Water Management Advisory Committee Representative

TJM:pb

cc: C.C.P.E.D.C. 208 staff
U.S.E.P.A. Environmental & Ecological Information Office

COMMENTS FROM : Harry Schroeder *

I recommend that we add a new sub-section to Chapter 6. Specifically to the section titled "Management Program" beginning on page 6-16. The new sub-section would be added to page 6-21.

This new sub-section would deal with the general subject of CONSERVATION and CONTROL of WATER RESOURCES.

In the sixth and seventh paragraphs on page 2-5 it is noted that approximately half of the rainfall is returned to the atmosphere through evaporation and through trees and plants. Also that 3/4 of the rainfall on ponds is lost through evaporation. Everyone has seen the power of evaporation--remember that big puddle in the low spot of the street you live near--and how the sun dried it up before night?

Obviously there is nothing we can--or should--do about the evaporation through trees, plants and ponds. But we can refrain from adding to it. And it will save money for everybody.

For example--golf courses (and people) water their grass during the day. Obviously the sun will evaporate a lot of the spray. All grass watering should be limited to the hours after sun-set and before sun-rise. This should apply to private wells as well as public.

Swimming pool evaporation is just as severe as the street puddle. There are probably many other areas of this kind. We should (have*) ways to minimize this problem.

Another area in which water can be salvaged is through re-cycling before it becomes septage, one example of this would be the re-cycling of water used by car washers and water entertainment areas like water slides and such.

It shouldn't be too difficult to measure the problem. For example, we could attach a questionnaire to the quarterly water bill (like we inventory boats by a questionnaire that goes with the tax bill) and determine the location and size of each swimming pool and the amount of water used per year in each pool and by the group as a whole.

We should review the rates charged for water to be sure we aren't encouraging the unnecessary use of water like gasoline prices, water prices will tend to encourage conservation and careful usage.

There must be many things we could do to conserve water and to control the unnecessary use of water.

The conservation of our water is everybody's most important business.

*Typed from original handwritten comments.

Association for the Preservation of Cape Cod

P. O. Box 636
Orleans, Massachusetts 02653

617-255-4142

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July 14, 1978

JUL 17 1978

Ms. Paula L. Magnuson
Cape Cod Planning and Economic
Development Commission
Barnstable, Ma. 02630

Dear Ms. Magnuson:

APCC would like to congratulate you especially and the rest of the CCP&EDC staff on the over-all recommendations of the 208 Program. I'm sure it required a monumental effort to put together such a vast amount of information.

Please find attached a few comments, the subject matter of which APCC would like to see incorporated in the final Plan. It is our opinion that these remarks clarify the material and generally strengthen your recommendations.

If you have any questions relating to this material, please get in touch with me.

Best personal regards,

Esther A. Snyder
Executive Director

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COMMENTS ON WELL RECHARGE AREA

When the results of computations based on scientific knowledge and speculation are given in a report, we think that the assumptions used should be made explicit. In addition, the implications of the results should also be clarified. We believe that the above comments apply to the Map 5.5. Here we find certain areas specified as needed to supply the assumed summer population of 1995. It is further stated in the text on pages 5-53 that the quantity of water needed is 100 gallons per capita per day. Further information is given on page A-44 (Appendix F). However, the basic theory and the assumptions made in order to apply it to the local conditions of Cape Cod are not given. 1

We think the following information would make the situation clearer to a decision-maker. First of all, the area from which water is drawn into a well is that area whose recharge rate is equal to the pumping rate or to the storage discharge rate. Storage is defined as the amount of water that can be released when the water table drops. Further, that all the recharge in the required area goes to the well and nowhere else.

For the total system to reach equilibrium after pumping is initiated may take tens or hundreds of years but will eventually show up as a general lowering of the water table as referred to sea level. The sea level has been slowly rising over the last few centuries, and since our fresh water supply is floating on sea water, therefore the water table has been rising with reference to the land surface.

Now in order to figure the area from which a given well actually draws water, we have to make at least two vital assumptions. One: the amount of recharge per square mile. If we use the natural recharge of 16" - 15" per year, we have implicitly ruled out man-made recharge from septic systems. Two: we further assume that the 16" of natural recharge are evenly spread throughout the year.

This latter assumption is far from the truth, as shown by the figures for Hyannis and Provincetown (see Table F1 in "The Environmental Impact of Ground Water Use on Cape Cod" by Arthur N. Strahler) where we see that there is little or no recharge during the months of May, June, July and August. Unless we figure in storage, we would have an infinitely large area of withdrawal, especially since these are the months of maximum usage. Storage could be eliminated if equilibrium conditions corresponding to year long steady pumping were actually the case. However, the seasonal nature of the Cape's water requirements makes exact figuring difficult.

We must also take into account that everything that leaches into the area of needed recharge goes into the well. For example, this is important when spray pesticide programs are undertaken. It is becoming ever more evident that the breakdown products and contaminants of pesticides are possibly more dangerous than the

pesticides themselves. It should be obvious that no herbicides such as 2.4.5T should be used along power lines that cross the wellfield withdrawal area, since the dioxane present as a by-product is one of the most potent carcinogens.

Diazinon is an organophosphorus pesticide available commercially for home and garden use and has been mentioned for tick control on the Cape. A toxic impurity, Salfotep, has been identified as present in Diazinon and is 30 to 120 times more toxic to mammals than Diazinon and is considerably more stable. These are only two of the more obvious problem products.

It should be emphasized that the present 400 sq. ft. radius of protected area around a well as mandated by the Commonwealth is based on the assumption that this will allow bacteria to break down all pathogenic organisms and fecal matter. However, if we allow home septic systems within the well withdrawal area, and these same homes are provided with town well water, then we face the possibility of constantly increasing the concentration of some impurities within the cell of water created by the well withdrawal, and out of which no water flows except to the well. It is perhaps the problems connected with this cell of water, which is essentially isolated from the rest of the Cape's hydrologic system, that are most difficult to convey without a detailed diagram of water flow lines. This diagram can be obtained from U.S.G.S. and should be included. 2

We believe some discussion along the lines suggested above is in order.

Assoc. for the Preservation
of Cape Cod
July 14, 1978

LINE BY LINE COMMENTS

1. Page S-3; S-14 - Monitoring by Barnstable County Health Department will require up-graded budget and staff to meet the scientifically necessary testing programs. The first paragraph on page 3-2 under "Organic Compounds in Drinking Water" serves as an important warning of the need for continued vigilance in monitoring water quality of Cape Cod.

2. S-4; S-6 - Reference septage disposal, both statements should point out that all methods should be temporary solutions with the exception of a safe chemical treatment.

3. Page 3-22 - Implications of the nitrate loadings per 40,000 square feet in terms of population density should be made explicit.

4. Page 3-43 - a report of a study by Slimak and Harris (1977) is referred to and a tabulation of their results is given in tables 3.11 and 3.12. Since part of their study was done on effluent from the sewage treatment plant at Otis Air Force Base, we believe that it is important that it be stated in the body of the 208 Report that the phthalates mentioned were plasticizers introduced by the plastic tubing used in sampling: "The use of plastic tubing could not be avoided during the sampling of the ground water percolate at Woods Hole, and explains the appearance of these compounds." (Study by Slimak and Harris)

It should be made emphatically clear that these potentially carcenogenic compounds are not present in the water as delivered to the groundwater by spray irrigation.

5. Page 3-50 - Reference to table 3.13 does not seem appropriate.

6. Page 3-53, table 3.13 - Impossible values given to Ph. Are column headings correct?

7. Page 3-54 - Dennis landfill, table 3.14 - The total nitrogen figure as obtained by summing the analyses of NO_3 and NH_4 would be more appropriate as an indicator of dangerous pollution than either figure alone, since NH_4 can easily convert back to NO_3. Even if some of the NH_4 remains as such, it is still highly corrosive of copper piping as normally used in modern houses. Heading of column might be $N/(NO_3 + NH_4)$, and still have 10 ppm as the danger point. The N.A. given under NH_4 is not really to the point.

Assoc. for the Preservation
of Cape Cod
July 14, 1978

AUG 14 1978

Environmental Defense Fund

475 PARK AVENUE SOUTH, NEW YORK, N.Y. 10016/212 686-4191

August 11, 1978

COMMENTS OF THE ENVIRONMENTAL DEFENSE FUND ON THE LAND USE MANAGEMENT PROGRAM FOR WATER RESOURCE PROTECTION IN THE WATER QUALITY IMPROVEMENT PLAN FOR THE CAPE COD 208 PLANNING AREA

The Environmental Defense Fund, Inc. (EDF) is a nationwide non-profit organization of over 45,000 members and an active staff of scientists, lawyers, and economists dedicated to the wise and efficient utilization and protection of natural resources. EDF has been particularly concerned with the protection of surface and groundwater supplies and is enthusiastic about the potential role of the 208 planning process in prevention of water supply degradation. We have been a member of the Cape Cod 208 plan Technical Advisory Committee and are vitally interested in the long-term proper management of Cape Cod water resources. Much of our concern is based on experience which we have had in observing the deterioration of similar water resource systems in Nassau and Suffolk Counties and judicial and administrative efforts to improve management of those resources. These comments on the Cape Cod 208 plan are limited to consideration of the suggested land use controls for protection of water supply.

The core concept of the Cape Cod 208 plan, like the Long Island 208 plan, should be watershed management. Maintenance of an adequate supply of high quality groundwater for Cape Cod's water supply depends upon proper management of and controls over existing and potential point and non-point source pollution activities in

OFFICES IN: NEW YORK CITY (NATIONAL HEADQUARTERS); WASHINGTON, DC; BERKELEY, CALIF.; DENVER, COL.

recharge areas on the Cape deemed critical to the protection of groundwater quality. An outline of a watershed management program for Cape Cod presented by me to the Technical and Citizens Advisory Committees dated August 20, 1976 is attached to these comments.

The Cape Cod 208 plan notes that the Cape Cod area is likely to be subject to great growth and development pressures in the near future. We feel that sound controls over degradation of water supply should be put into place before the expected development overwhelms existing controls and induces degradation of water supply. Therefore, we applaud those aspects of the suggested land use management program which seek to prevent degradation, in particular the prohibition of landfills, sewage treatment effluent disposal and the other enumerated uses which may generate potential contaminants in areas critical to water supply. The provisions suggesting restrictions on impermeable surfaces to reduce runoff and retention of natural vegetation also exhibit due consideration of water quality concerns. We appreciate that the 208 plan as a whole gives sound and reasoned consideration to a wide range of alternative land use controls to prevent degradation of the existing high quality of Cape Cod's water supply.

The 208 plan also proposes the use of zoning to prevent overloading of a critical area's ability to handle sewage treatment effluent. The recommended controls would allow for zoning of 40,000 square feet minimum lot size, and suggest 60,000 or 80,000 square

feet minimum lots in areas of existing higher density. The 40,000 square foot recommendation, the equivalent of 1 acre zoning, will be barely the minimum amount necessary to absorb the expected nitrogen load per household using the 208's own calculations. We feel that additional consideration might be given to an even higher zoning minimum, such as 2 acres. The Cape Cod 208 area has the unique opportunity to prevent degradation of the present high water quality, yet is here recommending the smallest lot zoning needed to inhibit degradation. We feel that a greater margin of error should be allowed for, particularly in light of the potential cumulative impacts of many of these 1 acre sites. The plan does recognize this to a limited extent by suggesting that areas of existing high density be zoned to a larger minimum lot standard. This principle should apply equally to areas of future development and an initial large minimum lot size may result in later preventive virtues.

Finally, in recognition of the administrative difficulties of identifying and controlling sources of point and non-point sources of toxic pollutants in particular, we think it altogether appropriate that the Cape Cod 208 plan adopt non-degradation standards for high quality ground waters which constitute any long term source of water supply for the Cape. In effect, the Nassau/Suffolk Regional Planning Board 208 Plan has adopted such a standard for high quality ground-waters in critical recharge areas for Suffolk County's deeper aquifer in Suffolk County. Because the management problems are similar, we attach as an exhibit to our comments Section 6 of the final draft of

of the Long Island 208 Plan. (The Plan is now at the printers.) Specific recommendations appear on page 6-10, Table 6-1 and 6-24 and 25. For Zone III, the critical recharge area in the central portion of eastern Suffolk County, the Nassau-Suffolk 208 study recommends that:

> "Land use control should be the primary method for protecting this valuable groundwater resource. Where residential development is allowed, require large lot development (two acre zoning or greater), encourage the existing large land holdings."

This recommendation is equally applicable to comparable portions of Cape Cod. In our view, existing state and federal case law amply authorize use of such land use controls, including reduced zoning densities (two acre lot size or less) to protect environmental amenities, including the quality of water supplies. See, in particular, Moviematic Industries v. Water Commissioners of Dade County (Florida District Court of Appeal 1977); Bridgeport Hydrologic Company v. State of Connecticut Council on Water Company Lands (11 ERC 1545, D. Conn. 1977) and Matter of Nattin Realty (3 ERC 1121, N.Y. Supreme Ct. 1971).

We would again like to congratulate the Cape Cod 208 group for the sensitivity to water quality issues exhibited in the plan. We look forward to the successful implementation of the suggested

controls and the preservation of Cape Cod's invaluable water resources. Please do not hesitate to contact us if we can be of any further assistance.

Respectfully submitted,

James T. B. Tripp
Counsel

Andrew S. Hogeland
Legal Intern

Enclosures

JUL 1 0 1978

Virginia Valiela
Box 237, North Falmouth
Massachusetts, 02556 U.S.A.

July 8, 1978

Dear Paula,

I have a few questions that didn't get covered when you came, and that don't seem appropriate to put in the Committee's report.

1. Have you come across suggestions about what we do with the plume from the landfill/septage pit/high school, etc. once we find it and find that its trajectory will endanger something? The high school irrigates its playing fields. I seriously wonder if we couldn't spray its plume on the fields instead. 1

2. Page 3-22 speaks of 6.9 lbs of N as Nitrate per person per year. Page 3-49 speaks of 15.4 gms/day of Total Nitrogen--which converts to 12 lbs of N per person per year. Those 2 figures may be consistent. I don't know. 2

3. Would you happen to have:
   a. EPA, 1976, "Quality Criteria for Water"
   b. the article by Kimmel & Braids (1974) re Long Is. landfills

4. Re page 4-32 and the discussion of composting septage and the lack of sufficient solid waste or sawdust (4-33). I wonder if the Eco-Fuel from the N. Bridgewater "resource recovery" plant might be an appropriate source of carbon, and absorbant at the same time. I don't know that the Eco-Fuel is being produced at present, and I don't know its cost: tho I had heard they had had difficulty finding markets for it.

Thanks for coming 2 weeks ago. We're having our final meeting this coming Wednesday.

Sincerely,

TOWN OF BARNSTABLE

OFFICE OF

BOARD OF HEALTH

397 MAIN STREET
HYANNIS, MASS. 02601

JUL 10 1978

July 7, 1978

Ms. Sylvia Daniels
Cape Cod Planning & Economic Development Comm.
First District Court House
Barnstable, Massachusetts

Dear Ms. Daniels:

Enclosed are comments concerning the Water Quality Management Plan/EIS for Cape Cod from the Barnstable Board of Health. Copies have been sent to the Town of Barnstable Review Committee.

Overall, I feel the plan contains useful, pertinent data and is a credit to your organization.

I would be happy to discuss any of our comments with you if you wish.

Sincerely,

John M. Kelly

John M. Kelly
Director of Public Health

JMK/mm
encl. 1

TOWN OF BARNSTABLE

OFFICE OF

BOARD OF HEALTH

397 MAIN STREET
HYANNIS, MASS. 02601

June 21, 1978

Board of Health's Comments on
WATER QUALITY MANAGEMENT PLAN

The WATER QUALITY MANAGEMENT PLAN/EIS FOR CAPE COD is a handsome, massive document accumulated over a three-year period at considerable expense to the Federal government.

It would be difficult to criticize the concept or goals of the plan which are to protect the water quality and water resources on Cape Cod. However, the Board of Health feels the plan is idealistic and, if implemented as presented, extremely costly.

The plan recommends a five-point management system for on-site sewage systems administered by the Board of Health as follows:

1. Hire a professional health agent. (Barnstable complies with this recommendation; however, three additional personnel and one additional clerk would be required to initiate a serious attempt to comply with all of the provisions contained in the plan.)

2. Adopting special regulations for sub-surface disposal. (Boards of Health already have this authority under Chapter 111-31, Massachusetts General Laws. Most towns have adopted regulations more stringent than Title 5, of the State Environmental Code. If local regulations are challenged, it has been almost impossible to obtain expert testimony in court at no cost from the very agencies that recommend these regulations be adopted.

3. Initiating a regular maintenance program. (This is a wonderful recommendation, but difficult to enforce. What action can we take against someone who won't have his septic tank pumped every two years who is causing no visible problem. It is interesting that the State of California who pioneered in the concept of towns taking over the management and maintenance of on-site sewage systems also is the state who recently revolted against property taxes with Proposition 13.)

4. Inventorying and upgrading sub-standard systems. (The Town of Barnstable, each time a building permit is issued, upgrades the sewage system within reason. If the system is in a potential problem area, it is upgraded to a septic tank and leaching facility. If not in a problem area, we allow conversion of a cesspool with sanitary tees to a septic tank concept and allow

an overflow leaching pit. This is done at half the expense of the full conversion. You can also solve the problem of overflowing cesspools creating an immediate health hazard more easily by allowing an overflow at a cost of about $400 rather than the $1000 for a tank and pit. We attended several 208 meetings and know that many ardent supporters have not converted their own systems from cesspools to septic tanks. 5

5. Educating the public on proper use and operation of a septic tank. (The Town of Barnstable was instrumental in having the Old Colony 208 booklet printed in both the Register and the Cape Cod Realtors Monthly.) In addition, all new home owners receive a septic tank maintenance instruction sheet and a diagram showing the location of their system. Supplying handouts and educational material should be a function of CCPEDC. 6

Communal septic systems are mentioned as a new concept in Massa- 7
usetts. Goldstein and Moberg report in their book, WASTE WATER
REATMENT SYSTEMS FOR RURAL COMMUNITIES (1973), that in California
ifty-five per cent of community sub-surface systems failed and that
ifty-six per cent of the package treatment plants experienced equipment
ifficulties. Thirty-three per cent of these plants by-passed untreated
ewage for periods ranging from six hours to three hundred days.

A question Barnstable should ask is - how does this plan effect 8
e Sewer Commission's comprehensive sewage plan for the Town of
rnstable?

Title 5, Sub-surface Disposal Regulations, State Environmental
de, replaced Article XI in July, 1977. Personnel from 208 had no
le in formulating this regulation although the 208 program had been
existence for two years. When Title 5 went into effect certain 9
rnstable County selectmen vehemently opposed this regulation and de-
nded an economic impact report from the State. The Cape Cod Times
d an editorial requesting this report. To date, we have heard
thing from these same selectmen concerning the economic impact of the
8 plan which will cost the towns at least ten times as much as
tle 5. Again, we must consider California's Proposition 13.

The 208 plan spells out what health departments are responsible for
t is quite weak in its' recommendation that the State Water Pollution 10
ntrol should consider using its' authority to require pump-out
cilities at marinas when they already have a law on the books requiring
is. (Law enclosed).

There is no mention or recommendations for grease traps or re-
iring restaurants to have grease barrels and use a rendering service 11
equired in Barnstable), although grease will soon clog a leaching
cility.

Innovative systems sound great. However, many have a dubious track record. They could also promote building in areas that cannot be serviced by conventional systems.

The Town of Barnstable was the first Cape town to construct a septage treatment facility. It would appear infeasible for Barnstable to construct another facility as mentioned in the plan.

The Board of Health initiated a request to use Barnstable's septage facility on a regional basis last year and endorses this concept if feasible.

Barnstable was also the second Cape town to receive State approval for its' landfill. We were very interested in participating in a water monitoring program at the landfill; however, at a meeting with the experts, specific data and plans for implementation were not provided.

The plan makes no mention of desalination by reverse osmosis. Enclosed is an article from the Well Water Journal showing Culligan's five gallon per day household system, that claims to remove most impurities from drinking water. This appears to be an innovative system that may be less costly than other methods.

Bourne, Falmouth, Barnstable, Yarmouth, Dennis, Chatham and Brewster now have professional health agents. Provincetown had a certified health officer for many years. The County Health Department has three sanitarians, one with a master's degree in Public Health, one in the process of obtaining a master's. If the remaining Cape towns act on the recommendations of 208 and hire a sanitarian, it leaves the County sanitarians with little to do.

It seems logical that the County Health Department would be in a position to direct the multi-208 program through its' existing staff with little additional help. The County laboratory is already in existence and water testing is the Barnstable County Health Department's major supportive contribution to the taxpayer's of the Town of Barnstable.

The plan contains a considerable amount of useful data and information and represents a conscientious professional effort on the part of the 208 staff who should be commended. Nevertheless, the Barnstable Board of Health cannot, in good conscience, wholeheartedly endorse a plan that cannot be implemented as a realistic,cost effective program.

TOWN OF BARNSTABLE BOARD OF HEALTH

_____

Robert L. Childs, Chairman

_____

Ann Jane Eshbaugh

_____

A. W. Mandelstam, M. D.

Town of Barnstable
Conservation Commission
TOWN OFFICES 397 MAIN STREET
HYANNIS, MASS. 02601
) 775-1120 EX. 128 - 129

JUN 1 2 1978

June 9, 1978

Ms. Paula Magnuson
Cape Cod 208 Program
C.C.P.L.D.C.
1st District Court House
Barnstable, Mass. 02630

Re: 208 Draft Plan and Economic Impact Statement

Dear Ms. Magnuson;

If a single suggestion were to be put forward which could help to insure that the proposals of the Cape Cod 208 Plan would be implemented and water quality protected, it would be that the Mass. DEQE be required to rewrite Part I (Inland Wetlands) of the Regulations issued under Mass. G.L. Ch. 131 sec. 40, the Wetlands Protection Act to make those regulations into performance standards, as has recently been done with Part II (Coastal Wetlands) of those Regulations. 1

Conservation Commissions already have responsibility to protect ground water quantity and quality, public and private drinking water supplies, and surface water quality. Guidelines could be provided through the Wetlands Regulations which could control pollutants in road drainage, surface runoff, and other point and non-point discharges near wetlands and water bodies.

Although not widely recognized or practiced, a Conservation Commission has the power to require cleanup and/or redesign of existing pollution sources such as road runoff conducted to water bodies, if the Commission views such a problem as a violation of G.L. Ch. 131 sec. 40 which, in fact, it is if it is having an adverse effect on water quality or fisheries. There is no mention in the Wetlands Act of exemptions for uses existing prior to the Act. This has sometimes been interpreted to mean that, technically, there are no pre-existing non-conforming uses if a particular project is causing water quality degradation. 2

DEQE representatives have, on several occasions, suggested that they lack a data base from which to revise the Inland Wetland Regulations: CZM provided them with such a base for revising the Coastal Wetlands Regulations. The 208 programs, however, have provided sufficient data base. This should be pointed out to DEQE, and 208 should insist on appropriate regulation revisions within a similar time frame to that allowed for the Coastal Wetland Regulations.

Sincerely,

Arlene Wilson

Arlene Wilson
Co-Chairman

cc: Nancy Anderson, M.A.C.C. 32
Thomas Mullen

ETH:mcm

JUL 17 1978

July 14, 1978

U. S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, MA 02203

ATTN: Mr. Robert E. Mendoza

RE: Water Quality Management Plan/EIS for Cape Cod

Gentlemen:

The Review Committee for the Town of Chatham heartily endorses the purposes, the principles and the recommendations of the Draft Plan, subject only to the comments in the following paragraphs and attachments to this letter.

Chapters 4 & 5

A hydrogeologic/land use study and report completed for the Town of Chatham in 1977 provided extensive data on water quality, outlined a number of problem areas, assigning priorities for action, and recommended acquisition of water supply land, preparation of long range plans for sewer service and central water supply, and a number of amendments to zoning and subdivision regulations.

A comment on the Wastewater Management Problem Areas indicated by map and text in the present Water Quality Draft Plan is included in Appendix A, accompanying this letter.

Other comments herein include:

-a recommendation as to an additional problem area
-a question as to a designated problem area
-remarks on on-site system management planning
-statement on improved septage management in Chatham
-comment on land use management
-comment on application of the 201 planning process

All of the above are included in Appendix A.

Potential Sewer Service Area

While past thinking in Chatham has been to extend sewering along Main Street from the Town center westward approximately two miles, to George Ryder Road, as indicated by Map 4.2, page 4-65 of the Draft Plan, the present thinking is that sewering as far west as the Chatham-Harwich town line (additional two miles) should be contained in the Plan as an available solution, not only for the needs of continuing business and residential development on Main Street, but also for existing problems in the Category 2 and 3 areas on the south side of Main Street.

For further presentation of this matter, reference is made to the memorandum of the Chatham Water Pollution Control Board, dated July 13, 1978, with map, included here as Appendix B.

Clarifications and Corrections

Examination of data for Chatham (sewer system costs, land analysis, water pumping, watershed land) indicated that some comments should be made in the basis and use of such data. In a few instances, a typographical error introduces a problem as to meaning of the statement. All of the above comments are to be found in Appendix C.

General

In furtherance of the recommendations contained in the Draft Plan and also in the Hydrogeologic-Land Use Report of Metcalf and Eddy Engineers for the Town of Chatham (1977), Chatham has already taken a number of implementing steps, including:

1. Establishment of a semi-annual program of sampling and testing water from selected representative wells, for water quality monitoring.

2. Collecting data to identify areas to have priority in remedial or preventive action as to quality of ground water.

3. Studying ways of expanding central sewer and water systems and of financing the related costs.

4. Purchasing land for watershed "green belt", protecting private wells and potential central well sites.

5. Rezoning some areas to reduce concentration of on-site wastes, to protect ground water quality.

Members of the official boards of Chatham participating in the review of this Draft Plan have indicated that they intend to work cooperatively to implement the recommendations as far as they are applicable and feasible for the Town of Chatham. This would include various aspects, such as:

1. Public education as to septic system maintenance, rehabilitation and upgrading; water conservation.

2. A continuing Cape Cod regional program of water sampling and testing, and compilation and use of areawide water quality data for monitoring and management planning.

3. Improvement of procedures and reporting by septage haulers as a means of inventorying and overseeing individual septic systems throughout the Town.

4. Amending of subdivision regulations in regard to storm drainage and erosion control (without limit as to size of subdivision).

5. Cooperation in regional studies, testing, planning and project development as may be instituted by the Cape Cod Planning and Economic Development Commission.

The Draft Plan has been studied by the responsible boards of the Town of Chatham. A public hearing was held in Chatham on June 6, 1978. The comments given herein were developed by a Joint Review Committee composed of representatives of:

Board of Selectmen
Board of Health
Water Pollution Control Board
Planning Board
Conservation Commission
Natural Resources Advisory Committee

Respectfully submitted,

Edward T. Harrington

Edward T. Harrington, Chairman
Board of Selectmen

Wilfred N. Goodridge

Wilfred N. Goodridge, Member
Cape Cod Planning and Economic
Development Commission & Areawide
Planning Advisory Committee

CC: Cape Cod Planning and Economic
Development Commission
Attn: Sylvia Daniels

Wastewater Management Problem Areas

1. p. 4-22 Map 4.1 & text p. 4-19 & 20 - Another map, prepared by Metcalf and Eddy, Engineers, in a study with recommendations specifically for the Town of Chatham is included here. Both maps direct attention to several local areas, chiefly south of Main Street in Chatham. While the maps differ somewhat in boundaries of the areas, it will be understood that any project for sewering or other abatement action will first examine the situation in full detail and will thus indicate the boundaries of the area to be treated. Chatham is proceeding on this basis and expects that both maps will be relevant for this purpose.

2. p. 4-19 Additional Management Problem Areas - A current study (1978) indicated that past and future development in a certain residential area of ½ acre lots may create a problem situation within a few years. (1) The lot areas are minimum and can well result in on-site waste disposal difficulties. (2) The whole area is upgradient from a densely settled part of the town already designated as Category 2 or 3. (3) The area lies within one mile of the sewage treatment plant, It is contiguous to Main Street, South Chatham, for which sewer system extension is included in the long range plan. The subject area lies along Morton Road and Meeting House Road, extending north approximately one mile from Main Street, to the joining of the two roads and the northern limit of the 10,000 sq. ft. lot area zone, as indicated on a map included here. It is recommended that this area be considered in Category 3. 1

3. p. 4-22 Management Problem Area in question - Referring to Map 4.1 and Reference No. 9 of Table 4.1 Summary, the basis for designating this as a Category 2 area needs to be clarified. The area is undefined. Goose Pond Heights is a new subdivision, on paper but entirely undeveloped. There are no soils data and no history of septic problems in the vicinity. The entire area is now zoned for 40,000 sq. ft. lots. In the Goose Pond Heights subdivision the lots range from 20,000 to 30,000 sq. ft., with the larger lots adjacent to the pond. A few tracts have not yet been divided into lots.

It may be that available data applies more properly to the vicinity of the intersection of Old Queen Anne Road and Route 137, where a small general store exists, and where further limited business development may ultimately be allowed.

It is recommended that both areas (Goose Pond and Route 137) be considered in Category 3 for the present. 2

4. p. 4-20 Table 4.1 - Summary of Problem Areas - Further to Items 2 and 3 of this Appendix, an amendment to the Table, for Chatham, is included here, showing:
Reference No. 9- West Side of Goose Pond - Category 3
Reference No.12- added: Morton Road - Category 3 3

Management

5. p. 4-89 On-site System Management - The recommendations of a septic system maintenance program (paragraph 3, page 4-90), valid as they are recognized to be, can not be established or implemented as set regulations at this time under prevailing conditions, but every attempt should be made to comply with the intent. The necessary actions in this direction include:
1) Adoption of regulations and securing satisfactory compliance with regulations for septage hauler performance, including accurate reporting on type, location and condition (physical and biological) of on-site septic systems pumped and volume of septage pumped.
2) Public education as to the workings of on-site septic systems, the relationship to groundwater quality, the need for pumping at appropriate intervals, and the acceptance of the costs.
3) Establishment by the town of routines for detecting individual and neighborhood conditions calling for official action, such data also contributing toward a townwide inventory of septic systems.
4) Development of a practical basis for covering the cost of the program (both service and administration). It is anticipated that closer control of septage pumpers will increase the cost over the present estimates.
5) Adoption of initial program regulations applicable to: (a) new system only (for pumping) and (b) failing systems close to surface water bodies or to water table (for rehabilitation or replacement). 4

6. p. 4-93 Eeptage Management - Chatham has under construction, for operation in 1978, a modification of its sewage treatment plant to allow acceptance of septage from contractors pumping out private septic systems. It is believed that this facility will have capacity for the foreseeable future.
Use of the present lagoons at the landfill area is to be discontinues.
If pumping of private septic systems on a regular and comprehensive basis is instituted, septage treatment facilities of greater capacity probably will be necessary.
Chatham is ready to cooperate in any study for regional septage handling program.
(Reference may be made to page 7-15 of Chatham Profile.)

7. p. 5-14 Management Program - It is understood that zoning by-law changes regarding lot areas, land use and water supply protection areas must be based upon site-specific data including soils data, ground water monitoring, septic system performance records, developed cooperatively by the Board of Health, the Planning Board and others, as well as on a long range plan for sewer and water services as recommended to Chatham ny the Metcalf and Eddy hydrogeologic-land use report of 1977. 5

Profile - Town of Chatham

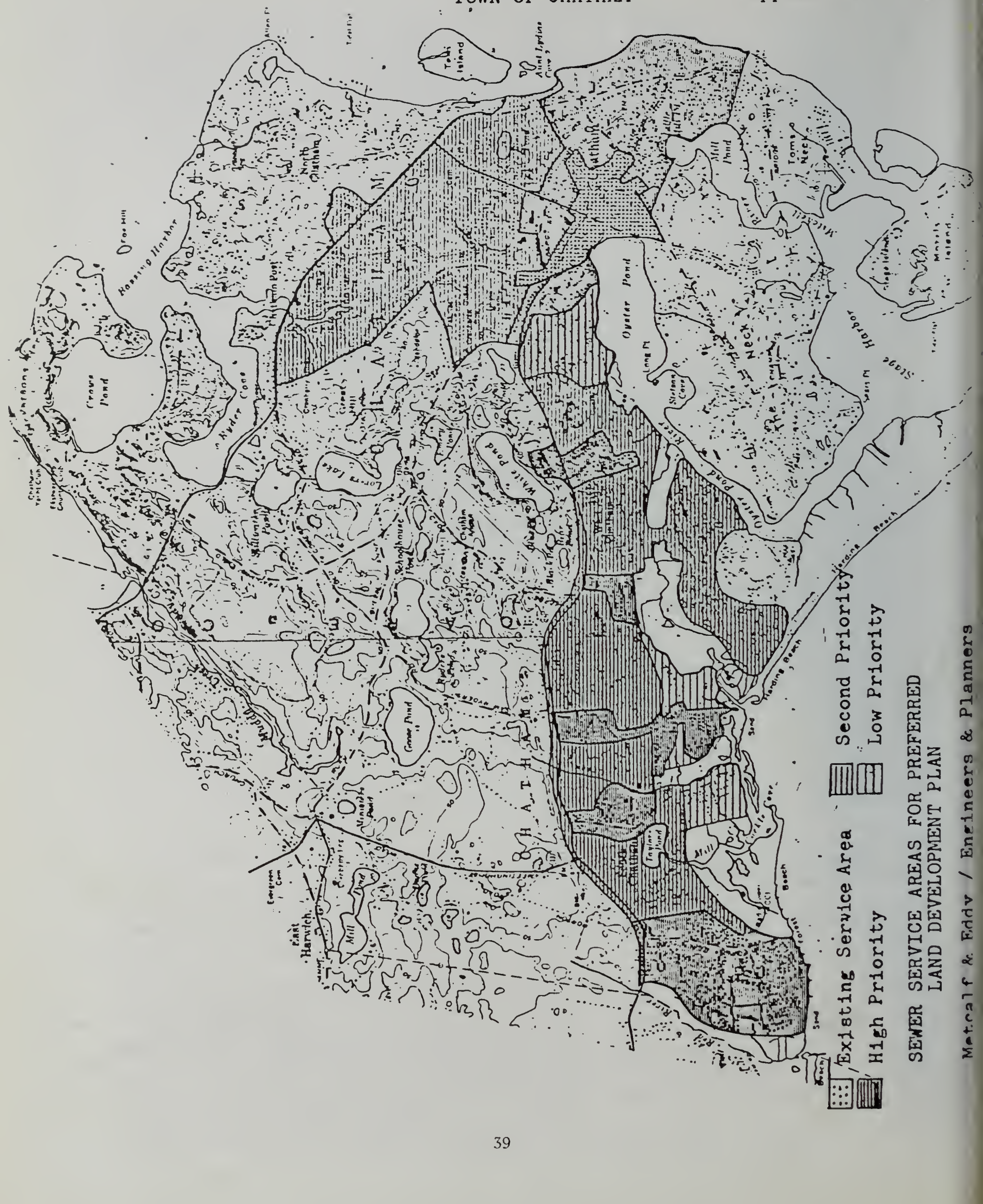
8. p. 7-14 - "Assessment" and "Recommendations" require no comment other than to note a typographical error in Remarks on page 7-15. The sentence should read "It is considered that this will accommodate septage needs for the foreseeable future". 6

201 Planning Process

9. p. 4-47 - It appears that funding availability is effectively limited to sewage treatment plants and directly related facilities. Greater emphasis and funding assistance should be given to the longer range goal of <u>prevention</u> and to projects which are developed to avoid future problems with their more costly solutions. Incentives should be provided to property owners and municipalities to plan and adopt timely measures which are more cost-effective than the customary practices. 7

TOWN OF CHATHAM

Appendix A 1

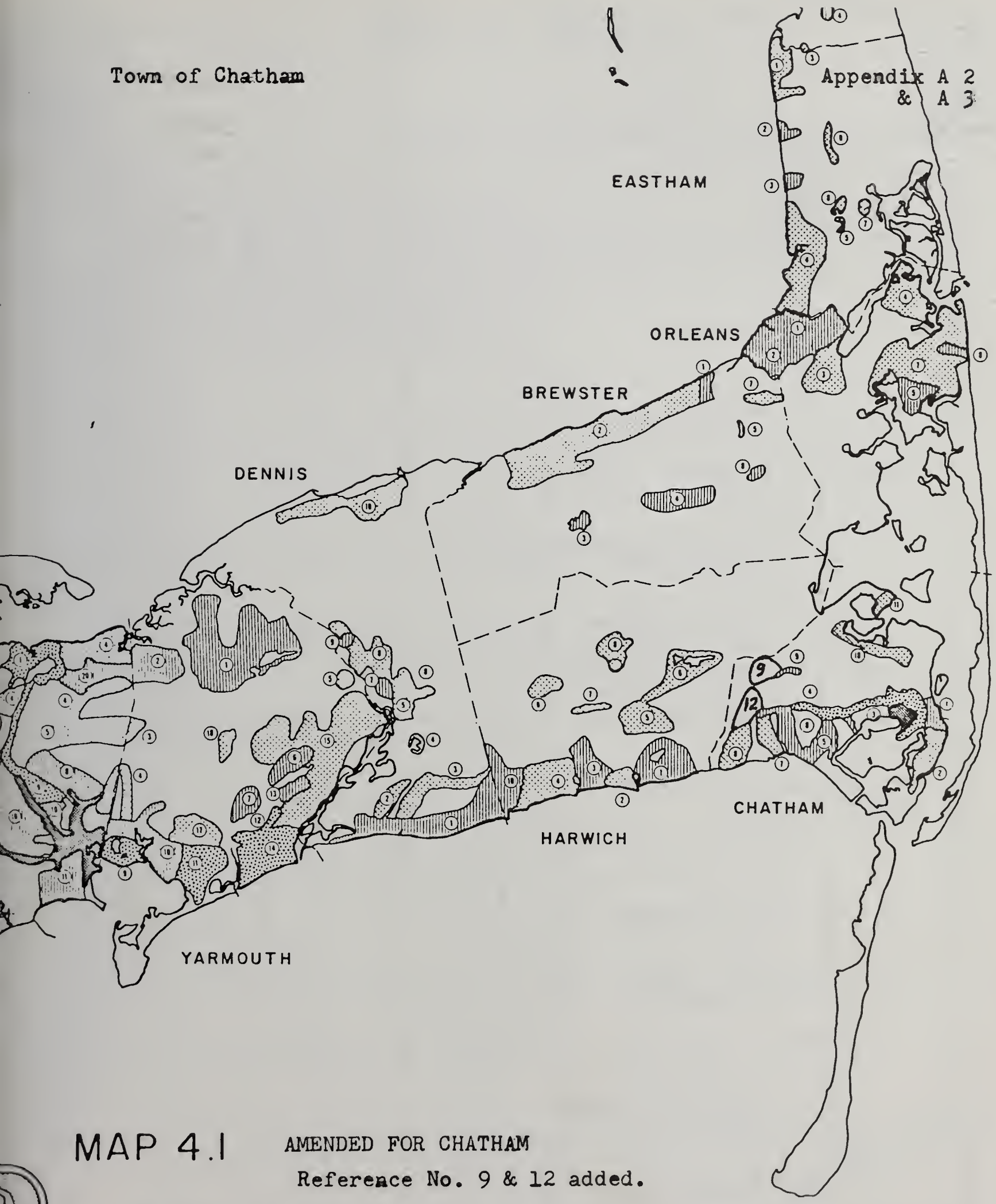


SEWER SERVICE AREAS FOR PREFERRED
LAND DEVELOPMENT PLAN

Metcalf & Eddy / Engineers & Planners

Town of Chatham

Appendix A 2
& A 3



MAP 4.1 AMENDED FOR CHATHAM

Reference No. 9 & 12 added.

CAPE COD PLANNING AND
ECONOMIC DEVELOPMENT COMMISSION

TABLE 4.1 SUMMARY OF PROBLEM AREAS - CONTINUED

Town	Reference Number	Section of Town	Sources of Information						Category
			Local Input	SEWNED	Groundwater Quality	Surface Water Quality	Engineering Reports	Up-Gradient from Water Quality Problem	
Chatham	7	Easternmost mile of Route 6-A		x			NA		3
	1	Chatham Village, adjacent to areas presently sewered	x	x			NA		2
	2	Main Street/Morris Island Road	x				NA		3
	3	Eastern West Chatham, along Main Street	x	x		x	NA		2
	4	Route 28, between South Chatham and West hatham	x	x			NA		2
Chatham (cont'd)	5	Harding Beach Road	x	x			NA		2
	6	Ridgevale Road	x	x			NA		2
	7	Cockle Cove Road	x	x			NA		3
	8	Bayview Road/ Forest Beach Road	x	x			NA		3
	9	West side of Goose Pond	x	x			NA		2
	10	Orleans Road		x		x	NA		3
	11	Eastward Ho Area at eastern end of Fox Hill Road	x						3
	12	Morton Road	x						3

Town of Chatham
Water Pollution Control Board
27 CROSS STREET
CHATHAM MASSACHUSETTS 02633
(617) 945-2286

Memo to: The Chatham 208 Study Committee
From: George B. Collins, 208 Representative
Chatham Water Pollution Control Board
Subject: Recommended changes to the 208 Wastewater Management Study
Date: July 13, 1978

The Chatham Water Pollution Control Board feels it is mandatory to establish a total plan for the Town of Chatham covering potential sewer extensions and to note those portions of the Town not recommended for sewering in the forseeable future.

Those areas not to be sewered should be considered for on-site maintenance with periodic pumping of septic systems under guidelines established by the Board of Health.

The Water Pollution Control Board recommends the peripheral extension of the existing collection system similar to the phase 2 extension outlined by Whitman and Howard as follows:

--Shore Road from the Coast Guard Station area north to Stepping Stones Road,

--Then westerly along Stepping Stones Road to the intersection of Queen Anne Road,

--Then continuing southerly on Queen Anne Road to Route 28 (Main Street).

--All areas within those boundaries would be included.

--Then an extension of the collection system westerly on Route 28 (Main Street) to the Harwich town line.

--All areas south of Route 28 (Main Street) would be considered as potentials for the plan.

--The area north of Route 28 (Main Street) in South Chatham including Morton Road and Route 137 (Meetinghouse Road) plus adjacent arteries and running north on Meeting-house Road to the intersection of Queen Anne Road.

A 201 Facility Study Plan would eventually be made to establish engineering designs and the probable need to increase the size of the treatment plant.

This submittal study would be based on the demographics completed in the Metcalf & Eddy report, the 208 Wastewater Management Study and the map of the new and failing septic and/or cesspool systems developed by the Town of Chatham. These total demographics would seem to indicate that an increase in nitrates flows will continue from sections north of Route 28 to sections south of Route 28 from new on-site systems, breakdown of the existing on-site systems and the wastewater treatment plant, as well as other pollutant sources. This is due to the fact that water flows in Chatham generally tend to travel from a high point north of Route 28 towards Nantucket Sound on the south.

The Water Pollution Control Board recognizes the scope of the recommendations, but feels that with its existing treatment facility Chatham should plan to protect its water quality thru sewering those areas where problems are developing and to establish a maintenance plan for those on-site systems that do not fit into the sewer plan.

LOCATION AND PLANNING MAP

CHATHAM · CAPE COD · MASS.

JANUARY 1, 1962

NICKERSON AND BERGER

ENGINEERS

ORLEANS, MASS.

TOWN OF CHATHAM INCORPORATED JUNE 11 1712 MASS.

SCALE 1" = 800'

DESIGNED AND COMPILED FOR THE CHATHAM PLANNING BOARD

© 1962 TOWN OF CHATHAM

REVISED JANUARY 1, 1967 - CHATHAM

© 1967 TOWN OF CHATHAM

REVISED JANUARY 1, 1968

REVISED JANUARY 1, 1971

TREATMENT PLANT

NO SEWER- MAINT. PROGRAM

To be sewered

Presently sewered

4-53

Clarifications and Coreections

1. p. 4-68 Table 4.10 Sewer system Costs for Potential Sewer Service Areas - It is understood that the "Flow (MGD)" figure of .71 MGD is based upon the service area indicated by Map 4.2, and the cost figure of $3,000,000 assumes the construction of approximately 3 miles of sewers and 3 pumping stations. However, as the flow of .71 MGD exceeds the design capacity of the present sewage treatment plant, (.44 MGD) it appears that further construction costs must be considered for expansion of the treatment plant. 1

2. p. 5-15 Table 5-7 Land Analysis, 1995 - It is understood that the area of "Vacant Buildable " land (last column) is the remainder after calculation of "Developed" land, derived from Table 2.6 Land Analysis, 1975. The increase over 3,300 acres (Table 2.6) was calculated on the basis of estimated population growth with secondary effects (accompanying areas of new roads and business lots). If the secondary effects were not as great as assumed throughout the table, the Developed Land, 1995 (Table 5.7) might be less and the Vacant Land, 1995 might be more - as 600 to 800 acres. 2

3. p. 5-26 Table 5.10 Water Use - It is known that the "Pumping Total (Gal.) for Chatham - 259,584,140 - is the amount for the Chatham Water Company only, and all figures derived from this must be so understood. Metcalf & Eddy estimates that this is 55% of the total water consumption of the Town, the additional 45% being obtained from private wells. On the basis, the Table should indicate approximately 412,000,000 gal. as the total Chatham consumption. The "Daily Average" would be in the order of 2,200,000 MGD. 3

4. p. 5-28 Table 5.11 Town Owned Watershed - It is understood that the Total Acres-1976 for Chatham (248) includes land held by the Cahtham Water Company and also the land owned by the Town of Chatham for water supply purposes. This does not include the tracts authorized in Special Town Meeting on June 27, 1977 - 6 tracts, 88 acres in total. 4

5. p. 5-37 Managing Growth, paragraphs 3 & 4 - It is understood that these should read:
   3. Towns will implement overall density requirements of one dwelling unit per one to one and one half acres in all public well recharge areas.
   4. Towns will implement density requirements of one dwelling unit per acre in all areas relying on private wells, around and upgradient of ponds and coastal embayments. 5

JUL 17 1978

Town of Dennis

South Dennis, Mass. 02660

Office of
SELECTMEN
394-0901
EXECUTIVE SECRETARY
394-0901
ASSESSORS
394-0903
BOARD OF HEALTH
394-0905

July 13, 1978

Mr. Robert E. Robes
Cape Cod Planning & Economic
Development Commission
1st District Court House
Barnstable, Massachusetts
02630

Re: 208 Waste-Water Management Plan

Dear Mr. Robes:

At their regular meeting of July 11, 1978, the Board of Selectmen reviewed the report of the 208 Waste/Water Study Committee and endorsed this report except those provisions relating to monies.

The Board of Selectmen of the Town of Dennis make no commitment either in favor or against any of these expenditures on the grounds that they are unauthorized to do so unless accepted by Town Meeting Vote.

Regarding the recent letter on continuing water quality planning funds, we have requested comments from our departments and this item will come before the Board at their next regular meeting on July 25, 1978.

Thank you for your cooperation.

Very truly yours,

Robert E. O'Neil
Town Counsel

REO/ETW

cc: Donald Moncevicz
Water Study Committee

TOWN OF HARWICH

Harwich, Massachusetts
02645

208

As required by the Federal Law relating to water quality known as Sec. 208 of PL 92-500, the Board of Selectmen appointed a seven member committee to review the draft Environmental Impact Statement dated March, 1978. This draft plan was developed by the 208 Areawide Planning Advisory Committee and said plan is the result of 2 years of meetings and hearings.

Specifically, the area of discussion and concern for the Harwich Committee, established for purpose of local imput, was to discuss the chapters relating to wastewater management, land use and non-point sources of pollution, and areawide management structure. To that end, the questionaire seemed to be the best device to begin with at the Public Hearings. Three Public Hearings were held, and though well advertised, there was no one in attendance but the Committee and the Press.

The Committee in answering the questionaire felt it was lacking in clear meaning as to the role of the local Government and the CCPEDC regarding the development and management of a water quality monitoring system in the region. If such a system is developed how would information gathering and analysis be carried out?

Under the wastewater management section the Committee was of the opinion that the bias toward treatment of sewage was important to those Towns currently experiencing difficulty with water quality but said nothing in favor of those Towns who for future protection of the water supply would favor acquisition of land around a well field or other public water supply to achieve the goal of the 208 Program. In other words, a Town of Towns seeking to prevent pollution might not receive encouragement for land acquisition as a means to prevent a problem as easily as those areas with current abatement problems. It may be that land acquisition will be cheaper in the long term than construction and maintainance of a central sewage system. Certainly prevention is a sound environmental improvement over cure, and reduce the need for large scale sewers. The Town of Harwich emphasises the acquisition concept as its primary concern.

Soil testing should have some method whereby annual water level standards could be seasonally adjusted so as to allow home construction for more than three quarters of the year. To require so much advance planning would be a hardship on the community as well as the individual. Harwich already exceeds the requirements of Title V. The figures representing the estimated cost for staff, sub regional treatment sites, and interim lagoon systems are much too low, and realistically revised to reflect total cost and maintainance.

Land use and non-point source control is currently in force in Harwich to a major extent. The Committee unanimously agreed that road salt be applied consistant with public safety for travel being the primary concern. The Committee also agreed that storage containers for gasoline and oil and hazardous chemicals currently fall under State regulations, and revision if needed should be handled at that level.

Areawide management found agreement in principle, but further debate was necessary relating to the costs of the program, and the source of the funding.

Local perspective in relation to the Town of Chatham will require a great deal of additional information before any positive program could be developed. The two Towns have well fields adjacent to a common boundary, and the proximity of the Chatham sewage treatment facility is critical.

The following observations are offered - No test results of local soil conditions and the impact of current sub surface sewage regulations exist. Better evidence is needed. The concept of centralized sewage treatment wherein the concentration of a Town's sewage in one section of the Town could be a future problem similar to Otis and possible contamination of Falmouth water supply. On the other hand, the concept of dispersion of less concentration by use of on lot systems by households based on careful planning should be acceptable. The statistics available on central sewage with the energy costs required to drive them may not be dependable. Also, what State and Federal funds are available to allow a Town the alternative to phase in additional wells or to upgrade wells if a pollution danger exists in present wells? This option may be less expensive than mandated requirements to construct treatment plant as a technique toward pollution abatement. County review of variances to Title V would appear to speed up the current system, and perhaps even allow for innovation as new ideas technical data is made available, particularly in the area of new experimental systems.

TOWN OF HARWICH

Members of the Plan Review Committee involved in completing the questionnaire:

Dr. Carl L. Clapp, citizen of the Town of Harwich
Norman Clark, citizen of the Town of Harwich
Irving Lightbown, citizen of the Town of Harwich
Richard Hathaway, Representing Harwich Water Department
James Stewart, Representing Harwich Planning Board
David Thyng, Building Inspector

Haden G. Greenhalgh, Chairman
Representing Selectmen and Board of Health

WASTEWATER MANAGEMENT

While this Committee exists as a result of the proposed Water Quality Management Plan Environmental Impact Study for Cape Cod, its primary responsibility is to the residents of the town of Harwich, and therefore its participation in the program should be directed to those actions, advice, and planning which will be of direct benefit to the town. If the opportunity still exists to retain the town's identity in the formulation of an acceptable local 208 program, then let Harwich remain separate, distinct, and apart from the national mess which includes Home Care, Home Health Care, Subsidized Housing, Public Welfare, Aid to Dependant Children, Children in Need of Services, CETA, EPA, etc, etc, etc.

In this connection and with specific reference to the management of wastewater, it appears that a basic course of action might well accomplish the objectives. Webster defines a problem as "..a question raised for inquiry, consideration or solution;. . . .a source of perplexity, distress, or vexation. ." and as a synonym refers to the word, "Mystery". Too often people are inclined to react to the latter part of the definition rather than the former, and this tends to compound the confusion rather than arriving at a solution.

The existing and potential problem areas have been identified in the Draft Plan, and efforts should be made constantly to keep them separate and address them properly. Within these areas are individual systems which are adequate, which are mechanically unfit, which are obsolete, and which are not only efficient but maintained in an efficient manner. All of them must be considered as to how they affect the individual user, the immediate neighborhood, and, in the end, the entire town.

Regulations established by the Board of Health which must include the the active participation by septage contractors as well as a professional Sanitation Inspector will serve as part of the overall Plan for 208 Program. To be effective and meaningful widespread distribution should be made of these regulations. Each person who, while within the boundaries of the town, takes a shower or cooks a meal and washes the dishes, goes to the john, builds a house, or has a drink of water plays a part in what happens to water. It then follows naturally that to one degree or another each of these people has a responsibility to himself and his neighbors to be aware of what happens to water. Public Education is the foundation for the success of this or any other program.

NORMAN CHATKE

Irving Lightbown

Dear Hagen,

Here is my understanding of a couple of major points we discussed at our last two water quality meetings:

1. Watershed land acquisition.

The Draft Plan states, on page 4-47, "Cape Cod towns .....are eligible for state and federal grants under PL 92-500. To promote that law's goals of cleaning up the nation's waters.....the federal government will pay 75 percent of the eligible costs of local sewer treatment projects. The Commonwealth of Massachusetts will pay 15 per cent of eligible costs of approved projects....."

But (our discussion brought out) prevention is better than cure. If we can prevent our municipal water supply from being polluted in the first place we have achieved the goals of the Clean Water Act and of the water quality management Plan in a much more environmentally sound way. We will have prevented pollution at the source and made the necessity of building sewers on a large scale much less likely.

These water quality goals are set forth in the report beginning on page 1-4. Goal #3 (first section) says, "To preserve the quality & quantity of the drinking water supply for present and future populations of Cape Cod"

Furthermore (the report goes on to say) "In realization of these goals the following objectives for the ongoing 208...program are established:"

page 1-4

Objective #5. "To identify watershed areas contributing recharge to existing and potential drinking water supplies, and to provide for the protectionof the water quantity and quality through special regulations of waste water disposal practices andland use in those areas."

Since we would be achieving the stated goals of preserving the drinking water supply for present and future populations of Cape Cod by protecting the municipal water supply, we believe we should set about doing this by the acquisition of land in watershed areas of present and future municipal well fields. Present well fields, according to the implications of the Report, are not adequately protected from future pollution, for page 5-27 states, "Protection of 11.5 acres of watershed does not, however, prevent dissolved constituents from contaminating the well. Public water supply wells draw water from under a land area extending, in most cases, far beyond the boundaries of the protected watershed areas" Thus we need more land, both to protect our present well fields and to protect our future well fields for municipal water.

Therefore we believe that the final 208 Report should state, clearly and firmly, that the same amount of dollar funding should be available for acquisition of land adequately to protect present and future municipal well fields as is now available for building sewers. The goals of such land acquisition are the same goals as are set forth in the Report, and the method of reaching these goals is more environmentally sound that is building sewers.

2. Onsite Disposal Systems

Our discussions brought out that more information than was contained in the report was needed to determine the best methods of rehabilitating present onsite systems, and that the installers should be contacted to find out from them what their groundroots experience was.

Irving Lightbown

TOWN OF HARWICH

Harwich, Massachusetts
02645

BUILDING DEPARTMENT (617) 432-0262

July 27, 1978

Chairman-Harwich 208 Study Committee

The following are my major concerns with the 208 Draft Plan:

1) Lack of pertinent and factual data -
   a) No testing of systems in our local soil conditions has been conducted to find out what degree of contamination we are experiencing.
   b) To what degree has compliance with Title V improved our situation, or to what degree will it improve?
   c) To what degree are the non-complying systems contaminating the aquifer?
   d) Emphasis seems to be to concentrate sewage in treatment areas. Is this truly better than individual on-site systems.
   e) Ground water flow should be defined.
   f) No adequate records on water table (rise and fall).

2) Policing and enforcement for preventive maintenance plan. This could be very costly at a time of increasing service costs and tax rate. (I don't believe the $2 per household per year estimate)

3) If Title V compliance is one of the answers, equal enforcement should be encouraged.

4) Plan suggestion of joint sewerage for East Harwich and West Chatham places a treatment facility extremely close to the well fields we are trying to protect.

5) If Harwich water is a potential regional resource, there should be regional, state or federal funding to provide additional protection and well field expansion.

6) Provision should be made for a local (county) Review Board for considering variances to Title V. DEQE cannot do this job fairly or adequately. Possible composition of this Board would be a DEQE Representative and four or six experienced personnel. Local inovative systems would be considered by this Board.

Chairman-Harwich 208 Study Committee July 27, 1978

7) Some credit should be given for seasonal usage.

8) If on-site systems are supposedly bad, treatment facilities so expensive, and conditions of the aquifer deteriorating, why has no one tried to "build a better on-site residential system"?

David E. Thyng
Building Inspector

DET/b

Town of Mashpee

JUN 6 1978

BOARD OF HEALTH
477-1777

Mashpee, Mass., 2 June 1

Ms Paula L. Magnuson
Public Participation Co-Ordinator CCPLDC
First District Court House
Barnstable, Ma. 02630

Dear Paula:

In relation to the Water Quality Management Plan/EIS for Cape Cod review the Mashpee B oard of Health makes the following recommendations to the Planning Board of Mashpee so that the aims of the program may be facilitated:

A. Recommends to the Planning Board the creation of a Well Field or source of Town Water Supply within the location of the Town Forest in Whitcombs Swamp. This area should be protected as a potential water supply source for the following:

1. The Town Hall Area
2. Route 130 area (although a hook up with the Cotuit Water district of B arnstable might be better)
3. Johns Pond homes on the South East perimeter of the pond
4. The United Church Village

B. Recommends to the Planning Board the need for requiring of Developers of Condominiums the use of septic systems which would provide treatment of effluent before discharge to the ground. This treatment to be proposed and used where cluster zone is concentrating the density of population on a small portion of a larger area.

C. The Board of Health strongly urges the Planning Board to increase the residential lot size to a minimum of one (1) acre.

Mashpee Board of Health
Charles F. Buckingham
Charles F. B uckingham, Chairman
Roland L. Wilson
Roland L. Wilsom, Agent
Charles Lawrence
Charles Lawrence, Clerk

cc: P. Magnuson
Planning Board of Mashpee
Mashpe Board of Selectmen
Norman Fitzgerald
Timothy Hennigan

Town of Sandwich

JUL 20 1978

BOARD of HEALTH

SANDWICH, MASSACHUSETTS 02563

July 19, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, MA 02203

Attention Robert E. Mendoza

Dear Sir:

The Town of Sandwich Board of Health is in agreement with this Draft (E.I.S.) for the Cape Planning and Economic Development Commission Section 208 Water Quality Management Plan. We are a regulartory board and we feel we have provided a worth while program for the Town of Sandwich. We are an elected board of three members and have been as far back as the 17th century. We have been concerned with water quality and have tried over the years to protect the quality of the water. For about twenty years the Board of Health along with the State Sanitary Codes has had regulations for septic tanks, cesspools, pits, filter beds along with grease traps and distribution boxes. From time to time we have made out our own regulations to improve on the systems. We were perhaps one of the first towns to accept Article XI of the State Sanitary Code. We have made a regulation that all wells shall be 50 feet from all property lines so that all wells will be 100 feet from one another and 100 feet from all subsurface disposal systems. This regulation we made in 1972. We have accepted Title V for the subsurface disposal of Sanitary Sewage and we enforce its provisions. This can not be said of other towns. Some towns have been very vocal in their opposition to Title V. Our Board inspects all developments for soil tests and percolation tests, as well. We have an agent that enforces Title V and also the State Plumbing Code.

For perhaps thirty years that we are sure, this Board has always had the assitance of the Barnstable County Sanitarians. We appoint them every year to represent this Board and make the necessary inspections to systems and restaurants as required. The ponds, streams, wells and marshes are tested numerous times each year. In this way we have been able to inspect and assure the community that the quality of the water in Sandwich has been good.

The Board has up graded the older sanitary disposal systems by enforcing Article XI and now Title V. The new systems are required to be installed under the rules of Article XI and now under Title V. All subdivisions are required to have soil tests performed in the presance of our agent and in the

number of places that we require. All installations that require the State officials to act on must submit plans to the State as well as to our Board. If the State does not inspect the systems, our Board's Agent will do the inspections. We feel we have been diligent in our efforts on subsurface disposal of Sanitary Sewage to insure, as well as possible, that we maintain the quality of water in Sandwich.

The Town of Sandwich Board of Health has actively insisted that the Town have a sewerage system for Sandwich. We would like to see the entire Town sewered. We understand that the economics of that solution may not be possible now. We do, however, insist that the so-called central village including Sandwich Beach Shores, Old Main St., Water St., Grove St., Tupper Rd., Rte. 6A, Town Hall Square, Jarves St. and the area down town, east of the railroad tracks be sewered. This is the general area that the Weston Sampson Company has been planning. If the people do not vote for this system at a future Town meeting other means will have to take place at once. The Board of Health has an alternate pl on the drawing board that can be presented to the people for their approval. We can not at this time anticipate what the people will do about sewerage system for the Town.

The Town of Sandwich in 1975 had an operational study done by Whitman and Howard Engineering Co. for the Town disposal area. The result of the study developed into an operational plan for a Sanitary Land Fill. This Land fill has been accepted by the State D.E.Q.E. and is a very successful operation. This also helps to protect the water quality in Sandwich. At the present time with the population of Sandwich, we can expect this land fill to be operational for at least 10 years. We are completing our recycling program this year. We have not deposited papers in this land fill for at least 15 years. From time-to-time, we have recycled ranges, refrigerators, etc. when there was a market for them. Sandwich has one of the few approved land fills on Cape Cod.

We realize there are many more things to be accomplished, but they will take the combined efforts of all Town Departments and perhaps at some point a regional effort. If possible, we may attempt a regional septage system for Sandwich, Mashpee, and Bourne.

Very truly yours,

Robert H. Ellis

Robert H. Ellis
Board of Health

RHE:saa

cc Cape Cod Planning and Economic Development Commission

TOWN OF YARMOUTH
WATER DEPARTMENT
102 UNION STREET
YARMOUTH PORT, MASS. 02675

THE BOARD OF WATER COMMISSIONERS MEETS EVERY MONDAY
AT 7:30 P.M. AT UNION STREET OFFICE

WATER COMMISSIONERS
FREDERICK J. THACHER
ROGER G. EDWARDS, JR.
THOMAS E. KELLEY

SUPERINTENDENT
PAUL WILSON

SEP 11 1978

September 8, 1978

Cape Cod Planning and Economic Development Commission
1st District Court House
Barnstable, Massachusetts 02630

Attention: Mrs. Paula Magnuson

Re: Draft Report 208 EIS

As per our telephone conversation of today (7 September 1978) I would like to take this opportunity to rework on your Draft Plan for 208 Water Quality.

The report was generally well prepared and factual. However, I personally feel that Chapter 7 of the report needs qualification. While it is possible that Yarmouth might have to "borrow" water from Dennis, it is not probable. The reverse is also true. Current water inventory in Yarmouth is such that borrowing water under all but cataclysmic conditions is highly unlikely.

Very truly yours,

Paul A. Wilson
Superintendent

PAW/me

JUL 2 0 1978

July 19, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, Mass. 02203

ATTENTION: Mr. Robert E. Mendoza

Dear Mr. Mendoza:

I have recently reviewed the "Water Quality Management Plan/EIS for Cape Cod."

My particular concern is the lack of consideration which has been given to the Barnstable County Health Department under the discussion of "Monitoring Needs," Chapter 3, and "Monitoring, Testing and Analysis," Chapter 6.

The Barnstable County Health Department Laboratory is a State Certified Laboratory for bacterial and chemical monitoring, conducts all of the bacteriological sampling needs for all water departments on Cape Cod, performs chemical and bacteriological tests on private well water supplies, surface waters and has analyzed numerous underlying groundwater samples from sewage treatments plants and sanitary landfills. It is my sincere belief that our staff is well qualified and capable of planning and implementing a water quality monitoring program. I am very strongly opposed to having this proposed program divided under the Cape Cod Planning and Economic Development Commission and the Barnstable County Health Department as has been recommended. It is my belief that it would be very unfair to the County taxpayers from a cost effective viewpoint and inefficient and unwieldy from a management viewpoint to add two or three planners and divide this program among different agencies. 1 2

With the addition of <u>one</u> qualified environmental chemist, the Barnstable County Health Department could begin a water quality monitoring 3

program today. Additional resources in the form of laboratory equipment, supplies and personnel are already available.

Should you desire any further information concerning my comments, I may be reached at 362-2511, extension 331.

Sincerely yours,

/s/ Stetson Hall

Stetson R. Hall, R.S.
Laboratory Director

cc: Cape Cod Planning and
Economic Development Commisaion
First District Courthouse
Route 6A
Barnstable, Mass. 02630
ATTENTION: Sylvia Daniels

Mr. David Terry
Department of Environmental Quality Engineering
100 Cambridge Street
Boston, Mass. 02202

July 19, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, Mass. 02203

ATTENTION: Mr. Robert E. Mendoza

Dear Mr. Mendoza:

I wish to be on record as supporting wholeheartedly the Draft Environmental Impact Statement for the Cape Cod Planning and Economic Development Commission Section 208 Water Quality Management Plan. Considerable time and effort has been expended by many individuals and agencies in the development of it, and our staff of registered sanitarians is aware of the long-standing need for a detailed study and a comprehensive plan.

Our primary function and major contribution to this plan will be in the area of water quality control, including the planning, implementation and coordination of services. This County Health Department is in a unique position, it has been in existence for 51 years, and to date, it is the only County Health Department in this state and in all of New England. The Department offers both direct and consultative services in sanitation. In 1957 a "Survey of the Health Needs of Barnstable County" was compiled by the Department of Public Health Practice of the Harvard School of Public Health, which has since become known as "the Harvard Survey". This survey recommended that the County Health Department increase the sanitary bacteriology laboratory and employ a full-time laboratory supervisor.

For more than 20 years the County Health Department has planned and provided a monitoring service to the 15 towns here. Because of this experience and our expertise, we have taken issue with some of the statements and proposed plans which appear in the Draft Plan.

1. We believe that the "chemist" listed under proposed personnel should be a permanent staff member of this department, and his/her salary should be determined in line with that of other professional staff here. 1

2. We believe that this department has had a major role in planning, in coordinating and in implementing water quality monitoring and should not relegate these functions to Cape Cod Planning and Economic Development Commission staff, in the manner proposed in Chapter 6 (6-11). Further exploration of the process of joint planning and a clearer description of role relationships and administrative responsibility would be desirable. 2

3. We are not recommending the "hiring of a health agent, at least on a part-time basis" by communities that "do not now" have one (6-11). First, all communities do have a health agent - some are full-time registered sanitarians, some are full-time with other backgrounds, some are the building inspectors who serve part-time as health agents, with the assistance of our staff sanitarians and myself. 3

   In the small communities it would not be cost effective to employ part-time or full-time sanitarians, and hence the County Health Department expects to continue to serve such populations.

4. We expect to continue to inform, educate, coordinate, protect, prevent - in the area of water quality control - in accordance with our capabilities, as we do in other areas of health protection.

I have urged our staff sanitarians and the town health agents to send in their own comments: some of the above comments may be reflected in their reviews also.

Sincerely yours,

Esther G. Howes
County Health Officer

ECH:pma

cc: Sylvia Daniels
Cape Cod Planning and
Economic Development Commission

Barnstable County Commissioners

David Terry
Department of Environmental
Quality Engineering

COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

AUG 10 Rec'd

MEMORANDUM

TO: Dave Terry, 208 Program, DEQE

FROM: Les Smith, CZM

DATE: August 7, 1978

SUBJECT: Draft EIS and Proposed 208 Water Quality Management Plan for Cape Cod

Overall, the draft plan is very well done. The Cape Cod Planning and Economic Development Commission's 208 staff, as well as everyone else involved in the development of this planning document are to be commended for their good work.

Line by line comments

Page S-9 # 2 - Storm Water Runoff - Urban runoff pollutants are concentrated in the bottom sediments of harbors, usually located in estuaries or embayments. When these pollutants are resuspended and mobilized by ship traffic, dredging or other disturbances, they pose a grave danger to the water quality of these coastal waters. This problem merits some discussion in the plan. 1

Page S-9 # 4 - Hazardous Chemical Spills and Disposal - Oil spills in coastal waters should be discussed because they are one of the major pollutants contaminating marine resources such as shellfish. 2

Page S-9 # 6 - Control of Non-Point Source Impacts on Ponds - Long range land use control techniques should be instituted where appropriate, rather than use of herbicides. 3

Page S-13 - Local Conservation Commissions - Conservation Commissions in their review of projects for inland and coastal wetlands should ensure that pollution does not have an adverse effect on the groundwater and public water supply and shellfish and marine fisheries resources. 4

Page S-15 - DEQE - Mention should be made of the wetlands program of DEQE and the need to develop inland wetlands regulations with performance standards to protect water quality. 5

Page 2-1 - Geologic Formation - A more recent geologic map of Cape Cod was put together by Oldale as a 1976 U.S. Geological Survey Open File Report. The Sandwich moraine on Oldale's map does not extend as far to the east as shown on the Strahler map. 6

Page 3-48 - Impact of Boating and Non-Point Sources on Coastal Embayments - The case study of predicted pollutant loading from vessels' discharges into Falmouth Harbor points to a common problem being experienced in overcrowded, restricted coastal waters throughout Cape Cod. Although this study is by no means conclusive, it does point out the need to do a detailed analysis of this serious coastal problem. 7

Page 4-71 - Vessel Discharges - Discharges from Recreational Vessels: Federal regulations require marine sanitation devices on all recreational vessels equipped with sanitary facilities. With the approval of the Administrator of EPA, certain water bodies can be designated as no discharge areas if the protection and enhancement of the waters requires greater protection than would be afforded by use of MSDs. If it is definitively determined through a basin planning study, or other water quality study that discharges from recreational vessels in a particular water segment are causing a violation of the segment's water quality standards, CZM will recommend that the segment be designated as a no-discharge water. If boating activity in this area is such that it is generally confined to the segment, sufficient pump-out facilities should be provided at either public boating facilities in the segment, or if this is not feasible, at new private marinas if any are proposed for location in the segment. (MGLA c. 91, s. 59B will be used to require pumpout facilities at private marinas if necessary.) CZM will actively work with EPA and DWPC and marina owners to coordinate implementation of this recommendation as necessary. 8

Page 4-89 - Title V - Limiting the months for groundwater observation tests makes sense. Percolation tests could be performed anytime. 9

In coastal areas, the groundwater elevation changes in response to changes in the tidal cycle. Groundwater observation tests should be performed over a long enough time period to observe the effects of the highest period of the tidal cycle. In addition, corrections should be made to reflect the level of the observation well during the highest spring tide. 10

Towns are encouraged to adopt setbacks from mean high water greater than the 50 ft. minimum limit of Title V. In many instances, during spring high tides and during storm elevated sea levels, subsurface disposal systems would be inundated by sea water if the setback were only 50 ft. 11

Page 6-6 - Monitoring, Testing and Analysis - To properly understand the water quality status of Cape Cod's groundwater and surface water systems monitoring, testing and analysis are definitely required. The monitoring network should include setting up monitoring wells associated with sanitary landfills to observe for leachate pollution problems. 12

Page 6-7 - Land Use Management - Setback distances to ponds and coastal water bodies should be established to minimize eutrophication. 13

Zoning By-laws - Protection zones should be established around present and future well sites.

Education - Local citizens must be educated on the value of the groundwater system. The APCC has done a commendable job in this area. The following subjects need to be emphasized: 14

(1) Septic systems care;

(2) Encourage adoption of local protective zoning by-laws;

(3) Local support of regional, state and federal water quality programs.

Page 6-9 - Local Conservation Commissions also control storm runoff, erosion and sedimentation in wetlands and 100 ft. from the edge of wetlands. 15

Page 6-16 - Multi-208 Alternative - This alternative appears to be the most realistic for Cape Cod. The Cape definitely needs a technical staff to help towns with water quality problems and for the coordination of 201 activities.

Page 6-19 - Plan should provide information on the role of Conservation Commissions in the review of projects for wetlands areas. MGLA c. 131, s. 40 authorizes local Conservation Commissions to protect groundwater and public water supplies and prevent pollution in their review of wetland notices. 16

LBS:sar

JUL 2 0 1978

The Commonwealth of Massachusetts

Department of Community Affairs

One Ashburton Place
Boston, Mass. 02108

MICHAEL S DUKAKIS
GOVERNOR

WILLIAM G FLYNN
SECRETARY

July 17, 1978

Ms. Sylvia Daniels
Cape Cod Planning and Economic
Development Commission
First District Court House
Barnstable, MA 02630

Dear Ms. Daniels:

The Department of Community Affairs has received a copy of the Cape Cod Planning and Economic Development Commission's Draft Environmental Impact Statement and Proposed 208 Water Quality Management Plan for Cape Cod and has had the opportunity to review that document.

In its review of materials prepared by the State's 208 agencies, the Department has been concerned that the adoption of many of the management recommendations discussed in those reports may make it more difficult to construct low- and moderate-income housing in Massachusetts. The Department wishes to emphasize that the State's 208 agencies must recognize the relationship between, for instance, land use controls and housing opportunities and must integrate their 208 proposals with their other policies and objectives as planning agencies. 1

Of particular concern to the Department is the implication that population growth should be managed to accommodate water quality plans rather than that water quality plans should be designed to accommodate population growth. The State has recently informed local development officials (joint letter from William G. Flynn, Secretary, Executive Office of Communities and Development, and Frank Keefe, Director, Office of State Planning, to local development officials, June 23, 1978) that in implementing the State growth policy at the local level, "the emphasis is on accommodating rather than on limiting growth." Such a policy requires the employment of incentives to attract development to areas where it can be efficiently serviced simultaneously to the employment of disincentives to development in outlying areas. 2

In this context, the Department believes that the Bourne Development Scheduling By-Law (included as Appendix E) is an inadequate tool for growth management and should not be used as a possible model. This type of by-law has significant potential to raise the development cost of new construction and may discourage larger scale, "planned" communities which offer potential environmental advantages over scattered single-lot development. Since most growth is inevitable on an areawide scale, such arbitrary growth quotas impose increased growth pressures on neighboring communities. Consequently, this type of growth management mechanism is in direct conflict with both the housing and growth policies of the State. In addition, development scheduling by-laws may not only limit the availability of new housing in any given year, but also may take away protection given to developers by Section 6 of The Zoning Act. 3

The Department feels that the Commission's report does not adequately consider the fiscal impact that the alternative proposals would have on Cape Cod property owners. It should be noted that septic system operation and maintenance costs, sewering betterment costs, user charges, etc., could have a major impact on the region's tourism and retirement industries. In addition, we wish to point out that a community's share of design, capital costs, and operating costs (which could result in an increase of "from a few cents to a few dollars per $1,000 to the general property tax rate") could be quite significant for the Cape's towns with their presently low tax rates. The omission of such analysis also makes it difficult to assess the impacts that any of the 208 alternatives would have on housing opportunities. Of equal concern is the virtual disregard for the enhancement of housing opportunities in the design of the alternatives. 4

While the Department is in agreement with the Commission's recommendation that enforcement of Title 5 must be strengthened, we do not feel that communities should be allowed to do so by adopting regulations more stringent than those in Title 5 without obtaining the approval of the Department of Environmental Quality Engineering (see our May 6, 1977 letter to Mr. David Terry). 5 On a different matter, with regard to the Model Bylaw for Public Water Supply Protection Districts (included as Appendix G), special permits cannot be used for exemptions, Section 9 of The Zoning Act makes clear that special permits may only be used for specific types of uses. 6

Finally, the Department recognizes the importance of on-going septic system maintenance programs and hopes that our report Managing Seasonal Neighborhoods in Transition has been of use to the Commission's 208 staff.

Sincerely,

John P. Sawyer, Jr.

John P. Sawyer, Jr.
Administrator
Division of Community Services

JPS/bb
cc: Robert Mendoza, EPA
David Terry, DEQE
Wayne Sherwood, DCA
MEPA Office

M E M O R A N D U M

UBJECT: CCPEDC--Draft
EIR - March 1978 - 208

TO: Dave Terry

FROM: Paul T. Anderson, R.E.E.
Southeast Region

DATE: 17 July 1978

I have no major problem with the report. I suggest that all laboratory 1
unctions be handled by the County Health Department and that the 208 agency
tay out of public water supply as duplicative of DEQE's function. 2

TA/lp

DAVID STANDLEY
COMMISSIONER

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

Department of Environmental Quality Engineering

600 Washington Street, Boston 02111

AUG 10 REC'T

SUBJECT: Water Quality Management Plan/EIS for Cape Cod (3/78)

TO: Dave Terry, DEQE

FROM: Robert Klehm, DAHM

DATE: August 3, 1978

S-11 Point 6 - Towns should take immediate action ..... to regulate the the disposal of hazardous wastes.....
The State has the power to regulate the disposal of hazardous wastes. See regulation 16 of "Regulations for the disposal of Solid Wastes by Sanitary Landfill". 1

S-15 In reference to DEQE assisting CCPEDC in developing acceptable regional solid waste management program.
This task falls under the jurisdiction of DEM, not DEQE 2

3-51 paragraph 1, line 2 - waste disposal is that layes (not in)
paragraph 1, line 5 - fill is customarily practiced (not practises)
paragraph 5, line 4 - 532.5 mg/1 chloride (not hcloride)

3-53 Table 3.13
Ph should be pH
Shouldn't all of the pH values be divided by 100?
Why is the minimum pH value greater than the average value?
for CaCO, Calcium, Alkalinity, Chloride, and BOD: Should the periods in the average and maximum values be commas?
In the last line - lll should be pH. 3

4-35 Table 4.2
Figure No. 1 - Disadvantages: A properly operated Sanitary Landfill should not provide a hazardous environment for the operators.

Map 5.2 The legend does not state the meaning of the dashed contour lines.
Do the contour lines represent altitudes above mean sea level? 4

5-20 Table 5.9
In reference to the refuse annually generated by Winter Population; 5
What is the source of the figure 2482 lbs/person/year?

3-53 Table 3.14
What does C.C.E. mean? 6

1d

EVELYN F. MURPHY
SECRETARY

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

M E M O R A N D U M

TO : David Standley, Commissioner
Department of Environmental Quality Engineering

FROM: Evelyn F. Murphy, Secretary

DATE: July 21, 1978

RE : EOEA #02708, Draft Environmental Impact Report
Water Quality Management Plan

This document, which is a combined Water Quality Management Plan and Environmental Impact Report, presents a thorough analysis of the present quality of the water resources of Cape Cod and of appropriate measures to preserve water of high quality and to ameliorate existing pollution. The focus of the Water Quality Management Study was primarily on groundwater, the only source of drinking water in this unique and environmentally sensitive area of the Commonwealth.

One vital component of comprehensive water resource management is a program of water conservation. Given the heavy demand on the water supply due to rapid population growth in many Cape towns over the last few decades and given also the heavy seasonal influxes to the area, it is essential to limit waste of high quality groundwater. An additional benefit to an effective program of water conservation would be the extension of the functional life of septic systems in a number of areas where soils are not ideally suited to disposal of sanitary wastes. Although the report does make mention of the value of water conservation, further work needs to be done to develop and to implement water conservation as a complement to the water quality management program described in this report.

EFM/MK/dlb

THE COMMONWEALTH OF MASSACHUSETTS

OFFICE OF STATE PLANNING
JOHN W. McCORMACK BUILDING ROOM 2101
ONE ASHBURTON PLACE
BOSTON, MASSACHUSETTS 02108
(617) 727-5066

MICHAEL S. DUKAKIS
GOVERNOR

FRANK T. KEEFE
DIRECTOR

M E M O R A N D U M

TO: David Standley, Commissioner
DEQE

FROM: Frank T. Keefe FTK

SUBJECT: OSP Review of Areawide "208" Water Quality Management Plans

DATE: August 24, 1978

Attached you will find OSP's comments on the Final Dratt "208" Water Quality Management Plans which have been completed thus far by the regional Planning agencies. As you will see, the comments are given from the perspective of the effects these plans will have on the Commonwealth's Growth, Urban Revitalization and Economic Development policies, and the adequacy of the management alternatives discussion. While there were few if any acknowledgements of the Local Growth Policies much less State Policies, the "208" recommendations are generally supportive. For example, there were few mentions of the benefits for downtown growth and revitalization derived from sewage treatment plant expansions, and the full impact on industries trying to comply with clean water laws and regulations was seldom discussed in depth. However, since the recommendations follow the policies, in the main, I see no problem with the Governor certifying them from that standpoint.

However, my major concern with the RPA's "208" products (the process and various governmental roles will be the topics of a future letter) is that their discussions of management and coordination techniques are consistently weak and superficial.

I would think that identifying potential conflicts, examining decision making forums, and exploring innovative ways to coordinate and monitor the many intergovernmental management agencies would be appropriate subject matter for "208" management plans. However, in many cases this opportunity was apparently declined.

Consequently, I am recommending that certification for areawide management be withheld until a more comprehensive, detailed discussion of management and coordinative alternatives is completed in supplementary work. The exceptions to this are SRPEDD, Berkshire County, and Central Massachusetts RPA's which have adequately addressed the management topic.

OSP recommends that the Governor certify "208" Water Quality Management Plans according to the following chart:

RPA	State and Local Policy Compatibility	Adequacy of Management Alternatives Discussion
Berkshire County (Upper Housatonic River)	Yes	Yes
Cape Cod	Yes	No
Central Massachusetts	Yes	Yes
Martha's Vineyard	Yes	No
Montachusett-Nashua	Yes	No
Old Colony	Yes	No
SRPEDD	Yes	Yes

Note: Reviews of the MAPC and NMAC "208" plans will be completed in the near future.

Review of "208" Water Quality Management Plan for Cape Cod

I.. Compatibility with State Policies

A. Growth Policy

The Cape's residents are concerned with preserving the Cape's natural environment and the character of their communities (Local Growth Policy Statements, 1976). The problems caused by the rapid growth and urbanizing trend of certain areas has been alarming to most residents. While there is general acceptance that continued growth is inevitable, many residents are concerned with developments (such as sewage treatment facilities) that will accelerate growth and damage the Cape's natural resources. It appears that all recommended alternatives for the management of water quality on Cape Cod are compatible with both local and state growth policies. These alternatives are designed to keep large scale sewage treatment facilities to an absolute minimum, thus avoiding unwanted growth in rural areas as well as urbanized areas.

B. Economic Development Policy

The 208 analysis indicates that the Cape's economy is based in households, rather than industrial or institutional facilities for a substantial portion of the Cape's economic growth. On-lot waste disposal is the method most commonly used by small scale buildings. The 208 plans indicate that this method will be recommended for most industrial development on the Cape in order to limit the amount of sewage treatment facilities.

C. Urban Revitalization

The major urban center for the Cape is Hyannis. With increased primary waste water disposal systems this area will be better suited for attracting business, light industrial manufacturing companies, and year round residents.

II. Water Quality Management Techniques

The proposed methods of waste water management will protect the quantity and the quality of the Cape's drinking water as well as the recreational water. The management plans include: Location of major point and non-point sources of pollution, maintain population growth, minimize land development, maintain appropriate population density in sewered areas.

III. Unique Proposals

Cape Cod is not particularly interested in a massive over-designed water treatment plan. This region, as a whole, wishes to maintain the status quo with provisions for moderate growth and future development (on a small scale). All approved alternatives refer to the continued use of on-lot waste disposal with primary and secondary treatment facilities as back-up systems.

JUL 19 1978

July 12, 1978

U. S. Environmental Protection
Agency
Environmental and Economic
Impact Office
John F. Kennedy Federal Building
Room 2003
Boston, Massachusetts 02203

ATTN: Robert E. Mendoza

Dear Mr. Mendoza:

We have completed a review of the Draft Plan/Environmental Impact Statement Water Quality Management Plan/E.I.S. for Cape Cod produced by the Cape Cod Regional Planning and Economic Development Commission (CCRPEDC), and the following comments are provided.

It is assumed that this report is consistent with the approved Project Control Plan, and that the land use and growth elements of the analysis are consistent with Massachusetts Chapter 807 growth policy statements.

In making those assumptions the Department expects compatibility of land use and growth data and analyses and other aspects of the 208 Study with the same elements of the concurrent regional transportation planning effort. The Department recognizes the CCRPEDC as the agency responsible for all functional planning in the region and in this regard the CCRPEDC is funded to assure the level of coordination necessary to make transportation plans and programs compatible with other functional planning activities as elements of the comprehensive regional plan.

Finally, a concern is noted with this draft plan as an "Environmental Impact Statement" because there is no explicit

Robert Mendoza July 12, 1978

statement of the impact of this plan for water quality on present and future transportation system. It is felt that, although we assume the 208 plan to be consistent with other functional plan, and systems, as an "environmental statement" it should explicitly note the impact it will have on transportation and other aspects of the environment — natural and manmade. While alternatural solutions, which could permit or induce significant growth and land use change, are recommended there could be impacts on existing travel corridors which should be discussed. 1

Detailed Department comments are attached.

Very truly yours,

JOHN J. CARROLL
Commissioner

DHP/TAV/mh
cc: DOT
OEP
CCPDDC
John Hurley
Attch:

DPW - Environmental Section Review

Water Quality Management Plan Draft EIS for Cape Cod - March 1978

P. 4-64 DPW has an interest where proposed potential sewer service areas would impact state highways as shown on map 4.2 opposite page 4-66. Areas should be shown where such conflicts may exist in a larger scale. Highway routes should be placed on the sewer maps. 2

P. 5-21 Runoff of road salts is expected to be less of a problem as the DPW continues to pursue a "reduced salting policy" with better monitoring. 3

P. 5-21 The Department (DPW) has carried out a program to provide cities and towns with permanent salt sheds from a $1,000,000 authorization. Those cities and towns, outside the MDC, showing water supplies with a sodium contact greater than 20 part per million are given high priority. The towns of the Cape region should take advantage of this program when future funds become available. 4

P. 5-41 See notes above for page 5-21 and page 5-21 (salt sheds). 5

P. 7-14 Town of Chatham proposes extension of sewer system. Necessary to coordinate planning with DPW roadway projects in involved areas. 6

P. 7-39 Town of Sandwich proposes sewer system changes. Coordination with DPW is necessary. (see note for P. 7-14.) 7

P. 7-48 Town of Yarmouth proposed sewer extension system should be coordinated with DPW. 8

PAUL GUZZI
Secretary of the Commonwealth

The Commonwealth of Massachusetts
Office of the Secretary
Massachusetts Historical Commission
294 Washington Street Boston, Massachusetts 02108
(617) 727-8470

JUL 13 1978

MEMORANDUM

TO: DEQE 208 Planning Staff
Regional Planning Agencies

FROM: Patricia L. Weslowski, State Historic Preservation Officer

DATE: July 12, 1978

RE: Final 208 Water Quality Management Plan

MHC would like to take this opportunity in commenting on the Final EIS for the 208 water quality management plans to remind EPA, DEQE, and the Massachusetts Regional Planning Agencies of their responsibilities under the National Historic Preservation Act of 1966 and E011593 to protect historic resources which might be threatened from federal undertakings. This protection extends to both properties listed in and eligible for listing in the National Register of Historic Places.

As the 208 plans are implemented and construction is planned, it may be necessary to survey the area of any proposed action in order to determine if NR listed or eligible properties might be affected. If properties might be affected, the procedures of the Advisory Council on Historic Preservation must be implemented (36 CFR 800) in order to protect historic resources.

MHC is available to provide information on historic and archaeological properties in the state, and can help develop appropriate scopes of work for field surveys. We should also be consulted during the process of Advisory Council review.

If you have any questions, please don't hesitate to call.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

477 Main Street, Yarmouth Port, Ma. 02675 Telephone: 362-9332

Subject - Soils of Cape Cod - Comments

To: Sylvia Daniels - Cape Cod Planning and Economic Development Commission

From - Richard J. DeVergilio - Soil Conservation Service

Dear Sylvia;

The following are comments regarding the 'Soil' section of which you wished be reviewed.

1. You may wish to add this statement 'There are areas on the Cape where there is consolidated glacial till referred to as fragipan by Soil Scientists. 1

2. The General Soils Map used in preparing the "Pilgrim Report 1975" evidently was an old one. Some soils are mentioned in the report that have not been on the Barnstable County Soils Legend for some time. It is recommended the paragraph on the General soils associations be omitted. 2

3. Second paragraph. These kettle hole depressions tend to be wet much of the year, with the higher surrounding sands being <u>well drained and excessively drained</u>. 3

4. Third paragraph - The remainder of the Cape is characterized by coarse sands, some tidal marsh, peat areas and occasional <u>slowly permeable</u> glacial till. 4

The more complex till areas are found in a strip running from eastern Falmouth North towards Sandwich and <u>then extending easterly through Dennis and into Brewster</u>.

REGION I
Room 800
hn F. Kennedy Federal Building
Boston, Massachusetts 02203

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
AREA OFFICE
BULFINCH BUILDING, 15 NEW CHARDON STREET
BOSTON, MASSACHUSETTS 02114

JUL 10 1978

IN REPLY REFER TO:
1.1SE

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building Rm 2203
Boston, Massachusetts 02203

JUL 12 1978

Attn: Robert Mendoza

Subject: Draft Environmental Impact Statement
Water Quality Management Plan
Cape Cod

The DEIS for a Water Quality Management Plan for Cape Cod that was submitted to the Regional Office of HUD has been referred to the Boston Area Office for review and comment.

Review of the DEIS indicates that the proposed action for a "Water Quality Management Plan" is tailored to the individual community needs whereby the residents of the community can deal with the problem on an individual basis. It also appears that growth of the communities will continue regardless of the improvements made to the water quality. However, it should be kept in mind that the Capes' sole source of water is from its underground aquifer which the communities must protect in order to meet its demands and maintain its status quo.

Regionalization of a water authority for the area appears to be a logical solution to the solving of supply and waste water problems, maintainence and also insuring that future development does not jeopardize the quality of water resources. 1

With a good water quality management plan, it is expected that the quality of the human environment in the Cape Cod Area and its environs will be protected for those now in the area and for future generations to come.

Thank you for the opportunity given to this office for review and comment on this above proposal.

Edward T. Pollock

UTY Area Office Manager

United States Department of the Interior

OFFICE OF THE SECRETARY

JUL

Northeast Region
15 State Street
Boston, Massachusetts 02109

ER-78/465

July 10, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, Massachusetts 02203
Attention: Robert E. Mendoza

Dear Mr. Mendoza:

We have reviewed the draft water-quality management plan and environmental statement for Cape Cod as requested in the letter of May 19 from Mr. Adams.

GENERAL COMMENT

The draft statement and management plan are commendable for the thoroughness of the analysis of ground-water impacts and for the proposals for necessary studies and mitigation.

SPECIFIC COMMENTS

Page 4-96: We suggest that areal consideration for sewerage systems--regardless of lot size being considered--should be accompanied by stipulations as to spacing between wells and points of release of sewage effluent. The statement recommends that private wells be discarded if the average lot size is less than 1 acre (table 4.13, p. 4-98). Thus, it appears that further concentrations of withdrawals through central water-supply systems could result; the statement should evaluate at least in qualitative terms (pending the availability of the hydrologic models) any possibility of related increases in the potential for saltwater encroachment. This discussion of the relation between effective recharge area and well-screen setting (p. A-44) would be strengthened by inclusion of at least one representative log which would indicate the typical aquifer thickness and degree of vertical heterogeneity implied in discussing the effects of screen settings near the bottom of the aquifer. 1

JUL 1978

Page 5-12: Construction is described as very important to the Cape Cod economy. Availability of aggregate raw materials is critical to construction activity and should be so recognized. Present and future self-sufficiency of Cape Cod in respect to construction aggregates might have been an appropriate subject for discussion. If local supplies are zoned or regulated out of use, increased truck haulage, its attendant air and noise pollution, and road safety hazards may result. 2

Page 5-22: Sand and gravel excavations are cited as a cause of erosion and sedimentation on Cape Cod. The report should note that it is standard practice to design sand and gravel excavations so that they have inward drainage. Thus, any material eroded is deposited in the pit bottom. It should also be pointed out that in New England most sand and gravel pits receive rapid subsequent use. They are reclaimed and are not left derelict or abandoned. Although it is recognized that sand and gravel pits are located in nearly every Cape town, it is stated that sand and gravel operations remove the natural soil and vegetation that provide a filter for water entering the ground. It should also be recognized that removing the surficial crust may increase permeability and aquifer recharge while lessening runoff. 3 4

Page 5-42: It is stated that sand and gravel operations should only be permitted to a depth of four feet above mean groundwater elevation. This seems unduly restrictive since one way of looking at a sand and gravel pit full of water is that it is an artificial "Kettle Hole Pond." These ponds seem to be highly valued in the report. 5

Thank you for the opportunity to comment.

Sincerely,

William Patterson

Environmental Officer

United States Department of the Interior

OFFICE OF THE SECRETARY

Northeast Region
15 State Street
Boston, Massachusetts 02109

OCT 18 1978

L-7619
ER-78/465

October 18, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, Massachusetts 02203
Attn: Robert E. Mendoza

Dear Mr. Mendoza:

As a result of our recent discussions with you concerning the Draft Environmental Impact Statement and 208 Water Quality Management Plan for Cape Cod we submit the following comments bearing specific concerns of the National Park Service as supplemental to our Departmental commentary letter of July 10, 1978.

It is highly commendable that your agency chose to submit this planning effort to the NEPA process. Whatever the benefits derived from your public participation process, this decision is sure to add comprehensiveness and understanding which the planning effort would not likely have achieved otherwise. We strongly support your intention to continue through the final environmental statement stage of this process.

GENERAL COMMENTS

The role and Congressionally mandated purpose of the Cape Cod National Seashore is not adequately presented. There is no indication in the review document that Public Law 87-126 (Seashore Authorization) set aside this area in the National interest for the preservation of its unique flora, fauna and physiographic setting. Though it may not have been foreseen at the time, this decision - and its implementation - have cast the National Park Service in the role of a major participant and concerned party in many land and water resource questions on the Cape. The Secretary of the Interior has delegated to the National Park Service the authority to administer the Seashore for these purposes and no reference to this has been found either.

The major reference to the Seashore in the document has been in the context of it providing sites for municipal water supplies to meet the increasing growth-related water supply needs of several Cape 1

communities. Obviously, this falls so far short of describing the Seashore's real purpose as to distort the facts and to be quite misleading to all interested parties.

The principal responsibility of the National Park Service is to preserve a part of Cape Cod's natural ecosystems. It has very few options open to it in regard to meeting municipal water supply needs. (P.L. 91-383 referenced below) Even these few options are seriously constrained by its primary obligation to preserve existing ecosystems. Should there arise a future situation where a conflict between these interests develops, the Service would have no choice in determining its position. The Congressional mandates would govern.

The Department of the Interior sees no reason why such a situation should ever develop. Where the 208 planning process addresses wastewater disposal issues, we support a commensurate and regional approach to water supply questions. A position could be taken that such an inquiry is not within the purview of a 208 effort. However, certain factors are in effect which argue otherwise. Principal among these is the definite possibility that the Cape or large portions of it are being considered for a "sole source aquifer" designation. This establishes a concrete relationship between the supply and disposal aspects of the water resource situation. Given such a singular relationship, it would appear illogical to address only one aspect, i.e. disposal, of the total concern. To the extent that such an approach is adopted, its conclusions and recommendations could be regarded as correspondingly questionable or even invalid.

It is not this Department's desire to advocate supplementary 208 efforts which are beyond the scope or authority of that program. However, we do hold that both the plan and its environmental impact statement will be seriously lacking in adequacy until they are revised to reflect more fully the above noted points. While this will not remedy what we regard as deficiencies, it will serve to formally acknowledge them and set the stage for remedial actions through other mechanisms such as regional comprehensive planning. 2

SUPPORTIVE INFORMATION

Even though the Seashore's resources have been set aside by legislation for future generations, pressures for removal of those resources are now evident and are likely to increase in the future. Recent plans and requests have been made for development of municipal water supplies within the Seashore, as, for example, those cited in this Draft 208 Water Quality Management Plan. The National Park Service policy on

development of water supplies within park boundaries can be expressed as follows:

> Public Law 91-383 is the only authority which would allow sale of park water, and an important requirement of this law is that there must be no feasible alternative. Further, "it should be emphasized that while Public Law 91-383 conditionally allows the Secretary of Interior to authorize the sale of services, resources, or park water, the Secretary's primary commitment, as mandated by the Congress, is the preservation and protection of National Park System resources and related dependent environment. In this regard, Service management policy limits water development and use, assuming no adverse impact on the natural environment, to the minimum required to meet visitor and employee water needs. In essence, water is a vital part of the park environment and a natural resource the Service is committed to protect and in reality cannot be excess or wasted water, as viewed by some applicants." (Special Directive 78-2, NPS)

The freshwater lens contained in the unconsolidated deposits forms the principal aquifer on Cape Cod and there exists a definite limitation in the quantity of water which can be extracted from the lens without damage to the Cape ecosystem. On the lower Cape, the National Seashore, because it encompasses a large portion of the recharge areas of the freshwater lenses in the Towns of Provincetown, Truro, and Wellfleet, will fill the vital role of watershed protection for these towns, particularly in regard to the quantity and quality of their common groundwater resources. This water, which can be obtained from under their own lands, is not limitless nor will it provide for unlimited development. However, within the sustainable capacity of the lens system the Towns have the opportunity for the wise husbandry of the water which flows to them as part of the natural hydrologic cycle. Problematically, the capacity is not equally distributed among townships, nor is it distributed in a manner compatible with certain recent growth patterns; the National Park Service cannot be placed in the position of broker to redistribute resources among the Towns. Nor can the Service endorse any plan or activity which invites overexploitation of the capacity of the freshwater lens system, which would lead to violation of the Service's mandate for ecosystem (especially wetlands) protection.

Of particular concern to the Service is the probable effects of heavy water supply demands during serious or extended periods of drought. Worst case situations would very likely cause permanent ruin to the ecosystems that now support the significant resource values of Cape Cod.

The National Park Service therefore would endorse regional or Cape-wide solutions to water supply problems which are developed by the Towns commensurate with the scope of waste water disposal considered in the 208 Water Quality Plan. The Towns working together with the cooperation of the National Park Service, all of whom must bear careful concern for their respective interests and responsibilities, can best achieve an equitable solution for sharing the limited resources particularly in the lower area of the Cape.

SPECIFIC COMMENTS

1. Cape Cod National Seashore should be delineated on Map 5.2 and indicated, perhaps as a large scale commitment to open land on Map 2.3. If the values for Reserved Open Space in Table 2.6 include Cape Cod National Seashore areas, some indication of this should be given. Recognition that the Gull Pond study is being carried out by the National Park Service with the assistance of United States Geological Survey might also be given. National Seashore lands should be shown on Map 5.6 (potential water supply) to indicate the jurisdictional constraint against securing water from within the Seashore. 3 4 5

2. Growth Projections
The Assessment and Analysis discussion (5-2 through 5-14) seems to clearly recognize the need for growth management and goes into considerable depth on summer and winter population projections and their effects on the economy. The impacts as expressed on the building construction industry indicate no adversity--in fact it is stated that the industry would be stable through the 20 year life of this 208 plan. We feel this section should present greater guidance for growth management or at least reference should be made to other sections of the 208 wherein growth management and capacity determinations are given detailed consideration.

We also recommend that this greater guidance encompass an appraisal of the environmental price attached to each level of this long-term incremental growth. 6

3. The effects of present and the projected increases in non-point sources are not realistically treated. Section S-8 recognizes that on-site systems (cesspools and septic tanks) are major sources of pollution on the Cape. The on-site system management program relies heavily on proper design and on proper septic tank management. Such management seems to incorporate mainly a suggestion for occasional pumping. The resultant pumped septage is placed in beds or landfills (S-7) which are particularly intense non-point sources of pollution (S-8). Water quality is being "managed" to accommodate new land use rather than the reverse. 7

4. Control of non-point source impacts on ponds (S-9). It is widely recognized that the application of herbicides is a cosmetic and often fruitless attempt to treat the symptoms of the improper land use which accelerates the rate of introduction of nutrients into such ponds. The real extent of the perturbations on the phytoplankton, zooplankton and litoral benthos is not known. The 208 plan should state and emphasize these concerns to protect the quality of the Cape's natural resources. 8

Some discussion of the potential effects of air pollution on the pH of rain (as in acid rain) on water quality should be given under air quality, or under non-point source pollution (cf. 2-18).

The study results indicating oxygen depletions in only 18 of 156 ponds may only reflect sampling procedure (3-38). Most ponds over 7-9 m stratify over the summer, and because most of them have a glacial origin, their hypolimnia have a rather small volume in relation to their total volume. These factors plus that of cultural eutrophication will probably be reflected in oxygen depletion in many ponds on the Cape. In the Seashore ponds, five of the six ponds over 7 m depth show oxygen depletions. Profiles must be made over the deeper area of the pond in order to detect the depletion, however, and in many ponds the deepest points are not centrally nor easily located.

5. Effects of groundwater extraction on the freshwater - saltwater transition zone (and on the edges of the lens) are not adequately treated. The important point is made that municipal water supply pumping reduces the amount of groundwater flow (2-7) but no clarification is given of the widely held misconception that, as long as the rates of pumping do not exceed total annual recharge for an area, no change in the freshwater lens occurs. A clear discussion of the changes in all dimensions of the lens, which accompanies well discharge should be given in any discussion of water supply planning. 9

SUMMARY COMMENTS

Cape Cod stands as a unique situation in terms of the relationship between water supply and wastewater disposal. That characteristic is heightened by the Department of the Interior having direct administrative jurisdiction over critical portions of the water resource. A further complication arises from the necessity of the Seashore to regard the resource in one context (ecosystem preservation) while local jurisdictions view it in another (economic stability and growth).

To the degree that these considerations and relationships are not equally emphasized with other concerns, the environmental impact

statement falls short of what it is intended to accomplish. Recognizing that the 208 program lacks authority to address such issues, we do not ask that their resolution be documented in this statement. However, it is reasonable to request that the final environmental statement evidence equal concern for these questions and document that continued lack of attention to them will almost certainly create serious future problems. 10

We appreciate your consideration of the above General and Specific Comments. The Park Service's recent experiences in having to provide emergency municipal water supply needs and renewed awareness of the 208 planning work for Cape Cod compelled the forwarding of these concerns in hopes that the best guidance for water quality management will be established.

Sincerely,

William Patterson

Regional Environmental Officer

FROM: DEPT. of Transportation
Federal Aviation Adm.
12 N.E. Executive Park
Burlington, Ma 01803

JUN 19 1978

Tele: (617) 273-7318

U.S. Environmental Protection Agency
Environmental & Economic Impact Office
John F. Kennedy Federal Building Room 2203
Boston, MA 02203
Attention: Mr. Robert E. Mendoza

Dear Mr. Mendoza:

We have reviewed the Draft Environmental Impact Statement for the Cape Cod Planning and Economic Development Commission Section 208 Water Quality Management Plan and have a few comments regarding it.

Our principal concern with water quality management projects is the possibility of unwise residential development near airports as a result of sewer extensions. This can be avoided with adequate land-use controls.

Unlike other 208 plans that we have reviewed, this one is not specific with regard to infrastructure investment and its effect on airport vicinity land use. Specific recommendations follow.

Barnstable. Airport land-use compatibility should be included if sewering is proposed for category 2 and 3 areas in the airport vicinity. 1

Chatham. Extension of sewer lines along Main Street may precipitate development of residential use that would increase airport noise complaints unless land-use controls are properly administered. 2

Falmouth. The town policy and planning agency should decide on future plans for the airport for inclusion in future land-use development. 3

Mashpee. Septage planning should include protection from incompatible land-use in the vicinity of Otis Air Force Base. 4

Provincetown. Location of any new landfill siting at the airport should be avoided if possible. 5

Thank you for the opportunity to review this water quality management plan for any impact on aviation activities.

Sincerely

Originated by:
DAVID L. RICKARD

DAVID L. RICKARD, ACTING CHIEF
Planning & Appraisal Staff

cc: Ms. Sylvia Daniels ✓
AEQ-1
TES-70
SECREP

208 Staff Responses

Juliet Bernstein
July 24, 1978

1. You are correct. See Appendix A.

2. While this laundry is noted on p. 7-14 as a suspected source of pollution in Frostfish Creek, water quality testing information has not definitely established the laundry as the source. It is suggested on p 3-12 that the town continue its efforts to determine the source of pollution in this area.

3. Further information on the cause of the loading and the source of nutrients would be necessary before a corrective program could be instituted.

4. A sanitary survey of the area would be necessary to determine which systems are discharging, if any. Use of dye tests would be helpful. Following replacement of failing cesspools or septic tanks, a maintenance pumping program would be quite effective in eliminating recurrance of the problem. Other sources, such as road runoff and wildfowl populations would also have to be investigated, and appropriate control measures developed.

5. See "Road Salt Application & Storage" in final plan.

6. See "Water Conservation" in final plan.

7. See "Water Conservation" in final plan.

Basil Edwards
July, 1978

1. See "Draft Plan Errata Sheet," Appendix A.

William E. Holland
June 27, 1978

1. See "Road Salt Storage & Application" in the final plan.

2. See "On-site System Management" in the final plan.

3. Some information on small packaged systems may be obtained in the coming year of the continuing 208 program. A survey of the condition and operation of the existing package treatment plants in the area should yield information on their performance and necessary management arrangements.

4. Information on financing of individual septic systems is being collected by CCPEDC staff. See "On-site System Management" in final plan.

5. It is hoped that a cooperative program with the USGS can accomplish this.

6. Until the DWPC and EPA establish a policy of regulating stormwater runoff under the NPDES permit process, it appears that local conservation commissions have the greatest authority in this area. See "Stormwater Runoff from Urbanized Areas and Construction-Related Activities" in the final plan.

Andrew Kamarck
June 1, 1978

1. See "Water Conservation" in the final plan.

2. See "On-site System Management" in the final plan.

3. Peak summer population is defined on p. 2-13. It is also defined on both Table 2.5 and Table 5.1 that deal with summer population. Since peak wastewater flows are needed to calculate the capacity needed for any proposed sewage treatment facility, it is believed that this method of calculating peak summer population is appropriate to the purposes of this report. Other calculations of facilities needs can also be calculated from these figures.

John A. Moser
July 13, 1978

General: Mr. Moser has pointed out several typographical and editorial errors which were overlooked under the pressure to meet a publication deadline. Most of the "definitions" used were taken from USGS and EPA publications and do not require further explanation here.

1. The seasonal fluctuations may affect dispersion patterns, resulting in "slug" formation within the "plume." Some plants actually draw from the groundwater, particularly in areas of high water table and lowlying coastal sections. Evaporation is this more than the interception of recharge. If the water table were lowered beyond normal seasonal levels, some lowering of evapotranspiration would take place. The intent of the loading formula is to estimate regionalized loading, as might affect a large withdrawal well.

2. See revised table in "Draft Plan Errata Sheet" Appendix A.

3. We have chosen and defined the term "recharge area" for our purposes to be synonymous with the area of contribution of a well. We agree that this is not technically correct, but felt it would be easier for the layman to understand.

4. We hope that by providing technical assistance to the towns in implementing these recommendations, we will be able to inform officials and citizens of the limitations of this approach. However, we do believe it is the most feasible approach and will contribute greatly to the protection of public water supply wells.

Thomas J. Mullen
July 19, 1978

See "Management Agencies" in the final plan.

Harry Schroeder
June 1, 1978

See "Water Conservation" section in final plan.

Esther A. Snyder/APCC
July 14, 1978

1. The draft plan attempted to supply as much of the basic theory and underlying assumptions used in developing the "recharge areas" concept as could be assimilated by the public and accommodated in a report that was required to be of limited length. It was stated in the draft plan, however, that technical assistance to the towns will probably be necessary in applying these principles. An implementation project has been prepared to provide this assistance.

The term "recharge area" was chosen to facilitate public understanding of the concept upon which the water supply protection areas recommendations were based. That is, as described in your comments, an area within which natural recharge from precipitation would equal the amount withdrawn by the well, on an annual basis.

The exact location of the surface and subsurface areas contributing recharge to a given well, more accurately referred to as the "area of contribution," could be identified for a given point in time only by obtaining far more detailed geo-hydrologic information than is presently available. The area will change with variation in any of the factors, such as change in withdrawal rate, precipitation, or the development of new withdrawal wells or wastewater discharges resulting in alterations of the water table in the vicinity of the wellfield and subject to fluctuation, as are the water table, the saltwater interface or the groundwater divide.

While a more conservative approach might be to assume drought rather than average recharge conditions, the 208 approach compensates by using the average daily withdrawal rate during the peak 90-day period rather than an annual withdrawal rate.

It must be understood that the 208 formula is a method of estimation only. It is hoped that experience in applying the formula and the continued accumulation of hydrologic information in the ongoing planning program will result in the refinement of the method. See p. 2-69 of "Water Supply Protection."

2. The "reflux" formula mentioned in Chapter 3 takes into consideration the increase in concentration of constituents resulting from recycling of wastes within the withdrawal area. It is assumed in that formula that an equilibrium would be reached; however, it is extremely unlikely that a situation in which total recapture would occur is likely on Cape Cod within the foreseeable future.

A diagram of water flow lines was prepared by Kerfoot (EMI 1976) utilizing what is now an outdated water table map. A correct diagram can be prepared by the layman by drawing flow lines perpendicular to groundwater contour lines shown on Map 2. 2.

Esther A. Snyder/APCC (cont.)

LINE BY LINE COMMENTS. Please see Appendix A of final plan for corrections to Chapter 3.

James T.B. Tripp/Environmental Defense Fund
August 11, 1978

See "Land Use Controls" section of final plan.

Virginia Valiela
July 8, 1978

1. Unfortunately the technology for recovering and treating wastewater plumes in not very highly developed. The nature and extent of the plume would have to be determined before any plan for abatement can be considered.

Please see recommendation on use of private wells for agricultural irrigation.

2. The nitrate loading referred to in p. 3-22 of the draft plan assumes removal of solids and the associated nitrogen by the septic tank. Page 3-49 deals with loading by a raw sewage discharge, which would include the nitrogen in the solids; hence, the higher nitrate concentration.

Barnstable Board of Health
June 21, 1978

1. The cost discussions in the draft plan, Chapter 4, alternatives section, are intended to demonstrate that the recommended preventive program is far less costly than "No Action," which will in many cases result in the need for sewering and water treatment. Mr. Kelly's own town has experienced the cost impact of sewering in its recent construction program.

2. See revised Barnstable Profile in final plan.

3. Planning agencies do not retain experts for the purpose of providing testimony in law suits. This would be extremely costly and probably outside of their authority and responsibilities. In addition it may result in serious problems of conflict of interest. The professionals and publications upon which the plan's recommendations are based are available to the towns. We will make every effort to assist them in defending actions based on our recommendations.

4. The implementation project proposed by CCPEDC to perform a pilot on-site system inspection program will answer some of these questions. It is hoped that voluntary cooperation of most homeowners will be obtained through an active public education program.

Regarding the voting of Proposition 13: First, on-site system maintenance is far less costly than sewering. Second, whatever management scheme is adopted, it will be funded primarily by user charges, not property taxes. Does Mr. Kelly have any information indicating there is a relationship between voters approving Proposition 13 and towns adopting an on-site system management program in California.

5. As discussed in draft Chapter 4, and as we have discussed with Mr. Kelly on several occasions, use of an overflow is not as effective as installation of a tank and pit. Water quality samples taken under the "clogged" cesspool used in such an overflow arrangement in the Long Island Water Pollution Study revealed considerable leaching of pollution from the cesspool.

5. It is hoped that continuing 208 funds will be available to provide such educational materials to cooperating towns, and to make them available as models to the entire Cape Cod region. As a planning program, the 208 program was limited in its funds for educational programs.

7. The "communal septic tanks systems" referred to in Chapter 4 are not the package aerobic tanks referred to in the studies quoted. The draft plan recommended package systems with serious reservations, and recommends that no such systems should be installed unless adequate operation and maintenance is provided. It is also recommended that all systems serving more than one user would be owned and operated by the municipalities to provide cost-effective areas and accountability of centralized management.

8. The plan incorporates existing sewering phases only. It provides for non-structural measures to be taken to prevent future development of sewer needs. If the towns does not take such preventive measures, it will not be eligible for any future funds for sewer construction.

9. The 208 plan provides considerable information to establish that on-site system management and Title 5 enforcement represent the least costly solutions to waste water management. Public participation to date indicates that this has been recognized by the local interests.

10. The plan states that this authority should be invoked when it is established that vessel discharges are the causative factor. Further analysis of available data, and possibly further data collection are necessary to make such a determination. The Division of Water Pollution Control, however, has stated its position that until the enforcement of MSD regulations has been shown to be ineffective it will not enforce this requirement. It is for this reason that the draft plan recommends that towns may wish to exercise their own powers in the situation rather than to wait for state action.

11. The 208 staff are investigating this suggestion. It is hoped that additional recommendations for the proper maintenance of commercially used septic tank systems can be developed in the continuing 208 program.

12. The 201 plan clearly recommends that innovative systems should not be used in new construction on sites where a standard septic tank system could not be installed.

13. See "Septage Facilities Needs" in final plan.

Barnstable Board of Health (cont.)

14. The meeting referred to was only an exploratory discussion to determine if any towns were interested. A number of towns have since indicated interest in cooperating and CCPEDC is pursuing the possibility of USGS assistance and expects to have more concrete data on othe method to be employed upon completion of the USGS study of the Otis sand filterbeds plume.

15. As mentioned by Mr. Kelly above, we feel it is not wise to depend upon innovative systems which are at present in the experimental stages. Desalinization of brackish water may be more feasible by the reverse osmosis process now than in the past; however, we feel it is only to be considered as a corrective measure to deal with existing problems and should not be a replacement for preventive measures. It must be recognized that desalinization is energy intensive and is, therefore, not a preferred alternative.

16. See revised management recommendations. The problem with relying solely on the County sanitarians for on-site systems management is that they are on call to the 15 towns and have 20 or more functions to perform, in addition to on-site system management. The 208 plan calls for a comprehensive on-site system management program which may not be effectively implemented by a town relying on case-by-case assistance from the County. As stated in the response to Ms. Howes, if the County can commit a sanitarian to work regularly with a town for the amount of time required to carry out the 208 recommendations, this would be considered acceptable implementation. We disagree that implementation of the 208 recommendation that each town have a qualified health agent would take away the work of the County sanitarians for all of the above reasons.

17. The existing County Health Department staff provides services and technical assistance to the towns in implementation of 20 or more health functions. They perform bacteriological testing, and, if a chemist is added, will perform certain chemical monitoring services as well.

The multi-208 program, on the other hand, is a comprehensive water quality management process which extends beyond the field of health services. The CCPEDC was designated by the Governor of the Commonwealth to prepare this comprehensive water quality management plan, and is the recommendation of the plan that the CCPEDC be designated for ongoing planning and coordination activities. The existing staff of the health department does not include the personnel necessary to carry out such a program.

Barnstable Conservation Commission
June 9, 1978

1. See "Land Use Controls" in the final plan.

2. See "Stormwater Runoff" in the final plan.

Chatham Board of Selectmen
July 14, 1978

Appendix A

1, 2, 3. The "Wastewater Management Problem Area Map - 4.1" will be updated in the continuing 208 program. Since Chatham plans to be involved in a detailed 201 Facilities Plan beginning in 1979, the towns's consultants will have the opportunity to further examine these areas to determine whether these areas should be reclassified. Based on the information furnished by the proposed 201 Facilities Plan, further revisions to this map will be made.

4. See "On-site System Management" in the final plan.

Appendix B

It is suggested that Chatham proceed with its current intent to apply for a grant form EPA to conduct a 201 Facilities Plan. It is recognized that the Chatham sewage treatment plant is presently utilizing only a small portion of its capacity causing operational problems. The extension of the sewerage system, to be eligible for 201 design and construction funds (Steps 2 & 3), must include only those areas in which a need existed in October 18, 1972. (PL 92-500). All other areas that have developed into problem areas since 1972 or which the town anticipates will be problems in the future may be provided with sewerage at the town's expense. In evaluating such recent or future problem areas, the town should consider both the cost-effectiveness and the environmental impacts of a sewered solution for these areas. The 208 planning staff will be available to assist the town and its consultant throughout its upcoming preparation of a 201 Plan of Study and in the facilities planning process.

5. While this type of information is valuable in determining whether high density is advisable in specific areas, it is not particularly relevant to the delineation of public water supply development areas. Zoning changes within these areas are based on nitrate loading calculations presented on pp. 3-20 to 3-22 of the draft plan.

6. See Appendix A of the final plan. (make change noted on p. 7-15 last sentence of paragraph 1, the word "favorable" should be changed to "foreseeable.")

7. It is the intent of the on-site system management program to accomplish this goal of prevention. The upgrading on-site systems is eligible for funding assistance as part of a 201 Facilities Plan. (See p. 2-47)

Appendix C

1. That is correct.

2. This is understood.

3. This table only provides pumping data on the public water supplies and does not include total pumping of both public and private wells for any of the towns.

4. That is correct.

5. That is correct.

Barnstable County Health Department
Stetson Hall
July 19, 1978

1. A meeting was held on August 8, 1978 between staff and Directors of the County Health Department and the CCPEDC to discuss the proposed monitoring program.

CCPEDC staff explained that it is not the intention of the 208 recommendations to divide the administration of either agencies' staff activities. The intent is rather for CCPEDC to coordinate the monitoring activities of the health department with the many other state and federal water programs operating in the Cape Cod region so that the best use of data can be achieved and duplication of effort avoided.

The CCPEDC staff explained at that meeting that the execution of a Memorandum of Understanding (MOU) between the two agencies would provide such coordination. As part of the MOU a work program for a private well testing program would be jointly developed, based on the staff, financial and laboratory resources of the County Health Department. Specifically, the inclusion of the chemical monitoring activities for the first year of implementation would be based on County Health's being able to find a qualified chemist under CETA funding, and for an ongoing program, on the health department's successfully establishing a position in its department for the chemist.

The administration of monitoring activities performed by the County Health Department under such an arrangement would remain under the County Health Officer, and would not be divided, as indicated by Mr. Hall.

2. The "two or three planners" referred to by Mr. Hall to be placed in the CCPEDC would not be involved in administering the County Health's monitoring efforts. They would assist in the development of the chemist's work program as a very small part of their responsibilities. They would perform the coordinative functions referred to above, assist towns in implementing watershed protection measures, update the 208 plan, work on wastewater management problems by providing technical assistance to towns. The proposed staff and their activities would not overlap in qualifications or activities with the County Health staff.

3. The CCPEDC has actively supported the creation of the chemist position in the County Health Department, and has pledged its continuing support.

Barnstable County Health Department
Esther G. Howes
July 19, 1978

1. It is the intention that the chemist be employed by the County Health Department. The staff salary recommended is based on a figure provided by County Health personnel.

2. The County Health Department has an important role in the planning and implementation of certain aspects of the comprehensive monitoring program as recommended in the "Water Quality Assessment" section of the draft plan.

3. In further discussion, County Health Department personnel agree that professional health agents should be available to all towns to carry out those aspects of on-site system management program recommended. The County Health Department feels such additional personnel should be maintained within their department and not on the local level. See "On-site System Management" in the final plan.

STATE AGENCIES COMMENTS

Coastal Zone Management
August 7, 1978

1. We agree further work on this subject needs to be done and will be examined in the continuing 208 program.

2. It has been the view of the 208 program that the problem of oil spills is being adequately addressed in the efforts of the Coastal Zone Management Program at the present time. Further cooperation between CZM and the 208 program in the area would be desirable.

3. See "Pond Management" discussion in final plan.

4. See "Management Agencies" in final plan.

5. See "Pond Management" and "Management Agencies" sections in the final plan.

6. Staff is trying to obtain the Oldale Map for future use.

7. See "Water Quality Assessment" section of the final plan.

8. See "Vessel Discharges" section of final plan.

9. See p. 4-8 in the draft plan which cites reference indicating that timing of percolation tests is also critical to resolve water table determination problems.

10. USGS study for DEQE now underway is expected to resolve water table determination problems.

11. See "On-site System Management" in final plan.

12. Recommendation is made in draft plan, see "Water Quality Monitoring" section of final plan.

13. A minimum setback of 100 ft. from a pond is recommended on p. 5-51 and carried through to coastal embayments on p. 5-52.

14. Such educational efforts will be an integral part of the continuing 208 water quality program.

15. See "Management Agencies" in final plan.

16. See "Management Agencies" in final plan.

Department of Community Affairs
July 17, 1978

1. A major recommendation of the draft plan is that homeowners maintain their on-site systems to ensure properly functioning systems and to avoid the development of failing systems requiring expensive repairs or sewerage systems. This minimal expenditure of $20/year for such a maintenance program considers the needs of low and moderate income homeowners. The recommendations of the draft plan would not add costs to construcion, but would save homeowner expenses in the long-run.

2. The emphasis of the draft plan is on accommodating growth while protecting water quality. Not all land areas are equally suitable for future growth. The draft plan identifies those specific areas that must have limited growth to protect critical water resources (and thus ensure an adequate and clean water supply for future growth) and also indicates that areas with public water or sewer service outside of these areas may better accommodate future growth.

3. Mr. Sawyer's disapproval of the Bourne Development Scheduling Bylaw seems completely inconsistent with his previous statement and the OSP's recognition of this technique in furthering the state's growth policy. The Bourne bylaw is a part of an overall program to eliminate wide variations in growth rates, protect environmental qualities and still broaden housing opportunities. (Other elements in Bourne's program include an "incentive bonus"--Open Space Village provision allowing variety in housing types, including multi-family, in most districts.) See Appendix B for a revised version of the Bourne bylaw.

4. The on-site system management program recommended for the majority of the Cape's homeowners is the most cost-effective protection of the Cape's water resources with the minimal impact on the Cape's economy. We are certainly aware of the impact of sewering costs on the property tax rate, and the avoidance of future sewer needs is a major emphasis of the draft plan and on-site system recommendations. There was not "a virtual disregard" for housing opportunities in the design of alternatives. It is suggested that towns consider encouraging growth in sewered areas and areas supplied by town water.

5. The towns presently have authority to strengthen Title 5 by adopting regulations suitable to specific regional needs and support for exercizing this home rule authority as suggested in the draft plan will continue.

6. Section 9 of Chapter 40A authorizes a variety of applications for special permits, but has no language stating that no other uses of that device may be made, whether under statutory or home rule authority. The legislative history of Section 9 makes clear that the intent was to broaden use of the special permit device, not to eliminate previously common uses of it, such as the one in the "Model Public Water Supply Protection Area Bylaw."

DEQE, Southeast Region
July 21, 1978

1. The County Health Department has too limited funds and staff resources to conduct all laboratory functions that would be desirable in the continuing 208 program. While County Health is willing to perform those functions feasible within its present limitations, Mr. Anderson's support for additional laboratory personnel in future budget requests would be most helpful. (Much of the comprehensive monitoring program could be carried out, however, i.e. pond surveillance, only by DWPC.)

2. While DEQE approves the installation of all public water supply wells, its activities in long-term water supply planning are limited. The full use of the USGS model of the Cape's groundwater resources necessitates the accessibility of regional water supply management planning assistance. As noted in the "Mass. Water Supply Policy Statement" of May, 1978, EOEA recognizes the need to direct the Water Resources Commission to "Initiate state level responsibilities for broad long-range water supply planning, coordinating with regional planning agencies, and using defined watershed areas for analysis." The Policy Statement also recommends a program of matching grants to fund regional and local water supply studies.

DEQE, Air & Hazardous Materials

1. See "Management Agencies" in final plan.

2. See "Management Agencies" in final plan.

3. See "Draft Plan Errata Sheet."

4. See legend explanation.

5. "Solid Waste Management for Barnstable County" by C. E. Maguire, Inc., p. 111-6 projects a solid waste generation rate by 1995 of 6.8 pounds/person/day or 2482 pounds/person/year.

6. Carbon Chloroform Extract is discussed on p. 3-12.

Executive Office of Environmental Affairs
Evelyn Murphy, Secretary
July 21, 1978

See "Water Conservation" in the final plan.

Massachusetts Department of Public Works
July 12, 1978

1. It is not anticipated that the 208 water quality management recommendations will have any significant impacts on transportation in Barnstable County. While construction of sewerage systems may induce a certain amount of added growth within the service areas, these areas are relatively small and any increased growth in these areas will not be significant in relation to the overall anticipated growth for the region and its potential impact on transportation. See p. 2-57 EIS (include transportation in chart).

2. The impacts on state highways of installing a sewerage system in the recommended sewer service areas would be of a short-term nature related to actual sewer construction. Such construction activities should be coordinated with the DPW where appropriate.

3. See "Road Salt Storage and Application" for recommended state and specifically MDPW action to cooperate in the 208 water quality management program. Major highways have been included in reprints of the maps that will soon be completed as a separate publication.

4. Same as #3.

5. Same as #3.

6. It is agreed that such coordination is needed. See "Sewer Construction Projects" in final plan.

7. Same as #6.

8. Same as #6.

FEDERAL AGENCIES COMMENTS

Department of Agriculture: Soil Conservation Service
April 12, 1978

1. See Appendix A of the final plan.

2. See Appendix A of the final plan.

3. Change does not appear to be necessary.

4. See Appendix A of the final plan.

Department of Housing and Urban Development
July 10, 1978

1. See "Management Agencies" in final plan.

Department of the Interior
July 10, 1978

1. The recommendation to "discard private wells" in the table of technical alternatives was intended as an alternative for the abatement of identified water quality problems in private wells. It should not be taken as an across-the-board recommendation for existing private water supplies, although the land use recommendations do include zoning for one-acre lots in areas to be permanently served by private water supplies.

These recommendations are intended to provide for the protection of water quality in the private wells, and do not bear upon the water quantity aspects of water supply and salt water intrusion. The potential for saltwater encroachment is affected by both the manner of water withdrawal (private vs. public supply wells) and the means and location of wastewater treatment and disposal. The balance between the two is quantitatively described in the section on environmental impacts of wastewater management alternatives.

2. The 208 draft plan does not recommend the prohibition of sand and gravel pits only the proper control of such pits to protect water quality. The control recommendations would not seriously affect the availability of aggregate materials on Cape Cod. It is also recognized that the availability of aggregate materials will become increasingly limited in the next 5-10 years. This is a major reason for the continued need to retain rail freight service to Cape Cod.

3. There are some sand and gravel pits on the Cape which have not been reclaimed and it is anticipated as many of the pits now in use become exhausted, this will be an increasing problem.

4. While removing the surficial crust may increase permeability, compactions from heavy equipment may negate this as a benefit.

5. The water quality problems caused by sand and gravel operations include exposing the water table to increased air pollution and potential gasoline spills from the equipment used in excavation. Soil erosion can be caused not only by runoff from the areas but also from wind removing soil from the exposed surface. It is unlikely that a kettle hole pond would form in such a permeable area unless the site were excavated below water table which would be undesirable due to increased water loss from evaporation.

Department of the Interior
October 18, 1978

1. The role of the National Park in preserving open space was reflected in all population projections and land use maps. While the 208 plan does not specifically delineate the purposes of the National Park, this omission was certainly not intended to imply that the Park was created for the purpose of providing water supplies to the lower Cape towns. The water supply discussion in this final plan has been substantially revised and reflects the Park policy in this matter.

2. It is difficult to understand how the reviewer could reach the conclusion that the draft 208 plan has only a wastewater disposal approach to water resource protection. The main thrust of the entire plan is the coordination of water supply protection and wastewater management. Perhaps the reviewer did not read the "Management Program" section of Chapter 5 which deals with this important relationship. The final plan provides even greater detail in the area of water supply planning and protection in the "Water Supply Management" section.

3. Map 5.2, "Water Quality Significant Land Uses" was intended to show sources of pollution. The Park would not have been an appropriate item on this map. The National Seashore Park is shown as a large-scale commitment to open land on Map 2.3. The Park boundaries are noted in pink. The entire Park was not colored in because the total area is not owned by the Park.

4. The ownership of reserved open space is not given for any item on this table.

5. Since all of the land within the National Park boundaries is not owned by the Park, the "jurisdictional constraints" cannot be said to apply to the entire area. This map was intended only to show the geo-hydrologic areas suitable for water supply recharge areas on the basis of present land use and other criteria.

6. Growth control is discussed in the sections referenced as an alternative land use measure. Specific recommendations on limiting growth are not made in the 208 plan. It is felt that more information and planning are needed before any concrete determination can be made on the basis of either water supply or wastewater considerations. It must also be emphasized that the 208 plan is not a comprehensive land use plan for Cape Cod.

7. It appears that these comments are based on the plan summary which does not address the plan's recommendations on on-site system management and septage treatment and disposal in the detail that is presented in Chapter 4. It is suggested that the reviewer read Chapter 4 and the "Wastewater Management" section of the final plan.

8. This comment is also based on the summary. A discussion of the need to control land uses on pond shores to achieve long-term protection from accelerated eutrophication is presented in Chapter 5. A revised "Pond Management" section is presented in the final plan.

9. The water quantity impacts of water supply development are discussed to a limited extent, in Chapter 4, Environmental Assessment. Salt water intrusion is not emphasized because it is not an imminent problem for most of the Cape. The 208 plan favors recharging wastewater to the ground and criteria for locating wellsites are presented that will also help to avoid salt water intrusion. Since it is extremely unlikely that any major outfall disposal systems will be constructed in the future, it is not expected that saltwater intrusion is as serious a problem as the protection of water supplies from non-point sources of pollution. A detailed description of the groundwater resource and salt/fresh water boundaries will be provided in the forthcoming USGS study reports.

10. The 208 program does not lack authority to address environmental preservation issues as suggested by the reviewer. These issues are addressed in every aspect of the draft plan including its environmental assessment discussions and charts, water quality goals and throughout its management program sections. Attention has also been given to economic considerations, but it is clear that the 208 plan, in meeting the goals of PL 92-500, is primarily an environmentally oriented document designed to help preserve and maintain the water resources of Cape Cod.

Department of Transportation
June 19, 1978

1. It is agreed that towns with airports that are considering installation of a sewerage system in areas adjacent to or even nearby the airport should employ the necessary land use controls to avoid inducing additional residential growth in these areas.

2. Same as #1.

3. Same as #1.

4. The comment regarding septage planning in Mashpee is unclear but the location of a septage facility in the vicinity of Otis Air Force Base should be considered a compatible land use (although an evaluation of water quality impacts of locating such a facility at Otis has not been conducted).

5. Regarding the possibility that Provincetown may relocate its landfill close to the airport, there is no such suggestion in the 208 draft plan, nor is it under consideration by the town, to our knowledge. However, it is recognized that landfills are not a compatible land use with airports due to the attraction of seagulls and the potential danger they pose to aircraft.

Draft Plan Review Committees

Questionnaire Summary

208 Staff Responses

Local Draft Plan Review Committees
Water Quality Questionnaire Comments Summary

Barnstable-BA*; Bourne-BO; Brewster-BR; Chatham-CH; Dennis-DE; Eastham-EA; Falmouth-FA; Harwich-HA; Mashpee-MA Orleans-OR; Provincetown-PR; Sandwich-SA***; Truro-TR; Wellfleet-WE; Yarmouth-YA**

*Mullen-Barnstable Fire & Water Dist.
Wilson-Conservation Commission
Kelly-Health Agent

**Karnes-Health Agent
Long-Taxpayers Association
Schroeder-Taxpayers Association
Ellis-Planning Board

***Taylor, William C.-Town Engineer

Regional & Local Water Quality Monitoring (See Ch. 3, pp. 3-55 to 3-58)

1. Do you agree with the recommendation that a comprehensive regional water quality monitoring system be developed and managed by the CCPEDC?

   Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, DE, EA, OR, PR, TR, YA (Schroeder, Long), SA

   No: YA (Karnes)

   Comments:

   Yarmouth - Karnes - "Under County Health Department" 1

2. Do you support funding a county position of chemist at $13,000/yr. to continue a private well monitoring program?

   Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, OR, PR, TR, YA (Long), SA

   No: YA (Schroeder, Karnes)

   Comments:

   Eastham - no answer, due to insufficient information
   Dennis - A chemist is already employed; need a sample collector (lab assistant) - $8,500/year. 2

3. Do you plan to monitor your sanitary landfill plume on a continuing basis?

   Yes: BO, BR, DE, PR, TR, YA (Long, Karnes, Schroeder), SA

   No: BA (Kelly)

   Comments:

   Barnstable - Kelly: No - Haven't located plume nor could 208 help. 3
   Eastham - Recommend to Board of Health
   Orleans - Need more information 4

4. Is your town willing to expend $2,000-$10,000 to participate in a regional landfill monitoring program with USGS & CCPEDC?

Yes: BO, BR, TR, YA (Schroeder, Long), SA

No: YA (Karnes)

Comments:

Bourne - The committee would be willing to sponsor such an article as this is obviously subject to town meeting approval for the said appropriation.
Eastham - Recommend to Board of Selectmen to bring to Town Meeting when program is ready.
Yarmouth - Long - "Voters must decide"
Provincetown - Town Meeting may not fund this because of high tax rate.
Orleans - need more information
Chatham - depends on direct benefits to town, cost to town, available funding.
Brewster - if done at Brewster landfill
Barnstable - Mullen - Probable.
Dennis - monitor wells are in place, would welcome further technical assistance, sample collecting, sample analysis, plume location analysis, and data meaning
Sandwich - We agree that the town should go along with this program, however we want it understood that at the present time the town is monitoring test holes around its landfill.

Wastewater Management (See Ch. 4, pp. 4-87 to 4-104)

6. Do you agree with the identification of wastewater management problems in your town?

Yes: BA (Mullen, Wilson, Kelly), BO, CH, DE, EA, OR, PR, YA - (Schroeder, Long), SA

Comments:

Eastham - There was some concern expressed by several of the members regarding specifics.
Chatham - Essentially Yes. However, there are differences in detail between Map 4.1 & Table 4.1 of the Plan & Fig. 3-4 of the Metcalf & Eddy Preferred Plan. Reference to Chatham's comments to EPA, Appen. A-1.
Brewster - We question Category #2 for South Brewster.
Sandwich - We have answered "yes" to this question only because we agree with your report in principle. We feel that the computer program for identification of the problem areas was very poorly explained and poorly done. The results shown were not indicative of the problems in the Town of Sandwich. Also, we find that the different types of alternative systems such as compost toilets and digesting toilets was not properly, or

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6

at best poorly presented. I think that in your explanation of the advantages of the different systems, you should have also stated the disadvantages of these systems. Also, you will find, or I find that the cost estimates given are actually not indicative of the present day prices. If the prices that you used to prepare this report are from two to three years ago, it should so be stated in the report. 7

7a. For Category 1 (sewer service area) towns: Will you take action to abate the problems in your Category 1 & 2 areas by:

1. Initiating or continuing a 208 Facilities Plan possibly toward construction of a sewage treatment facility?

Yes: BA (Mullen), BO, CH, PR, YA (Long, Karnes, Schroeder),SA

Chatham - Chatham has a sewage treatment plant in operation and wishes to utilize its capacity more fully by extending laterals in areas contiguous to presently sewered areas. Sewering & alternatives will be considered for other Category 2 areas.
Barnstable - Kelly - have plans, and comprehensive sewer plan.

7a. 2. Working to enforce alternatives such as upgrading failing systems, water conservation, and innovative systems?

Yes: BA (Wilson), BO, CH, PR, TR, YA (Schroeder, Long, Karnes)

Comments:

Yarmouth - Yes - Needs town meeting approval if not already a bylaw 8
Barnstable - Mullen - Some attempts planned.
Kelly - Already do. have reservations about innovative system. Must follow Title 5. 9

7b. For towns with no Category 1 areas: Will you take action to abate the potentially serious problems in your Category 2 areas by:

1. Seeking 201 funds to prepare a town-wide management plan possibly including construction of town-owned neighborhood treatment systems, a septage treatment facility and renovation of on-site systems?

Yes: OR

No: BA (Kelly)

Comments:

Barnstable - 201 prepared septage accepted at plant. 10
Orleans - Conflicts LEA & EPA
Chatham - See transmittal letter. 11
Dennis - Category 2 & 3 areas have been identified. Much has been previously implemented. Would concentrate on a management plan renovation on-site systems, additional inventories.

2. At town expense (additional Board of Health personnel), conducting inventories of problem areas, requiring upgrading of failing systems, constructing neighborhood treatment systems where needed, and constructing a septage treatment facility (perhaps in cooperation with neighboring towns)?

Yes: BA (Kelly)

No: OR

Comments:

Barnstable - Kelly, Only if additional personnel furnished. 12

3. Seeking funds to assist homeowners to upgrade systems through HUD or other funding sources?

Yes: EA, OR, BR

Comments:

Orleans - Try, but doubt if we would qualify.

8. Will you adopt the following sections of the on-site management program?

8a. Employ a qualified health agent at a cost of $13,000-$20,000 per year for on-site system management. (Towns that already have a qualified health agent may need additional staff to carry out a management program. Small towns may be able to share a health agent's services.)

Yes: BA (Kelly), BO, BR, EA, TR, YA (Schroeder, Karnes, Long), SA

No: BA (Mullen), PR

Comments:

Eastham - Regional Health Agent.
Barnstable - Mullen: probably not, Board of Health opposed.
Kelly: Yes, health agents have many state mandated duties besides sewage systems. 13
Dennis - Some staff is in place. May have to supplement.
Chatham - See transmittal letter.

8b. Adopt special subsurface disposal regulations designed to strengthen enforcement of Title 5 specifically:

1. Prohibit soil tests in the dry months of July, August, September and October. (This may be waived by the Board of Health if there are no silt, clay or other impermeable soils in the deep observation hole.)

Yes: BA (Mullen, Kelly), BO, BR, CH, DE, EA, TR, YA (Schroeder, Karnes), SA

No: PR, OR

Comments:

Bourne - This is with the understanding that the waiver provision would be contained therein. We were not in favor of prohibiting tests during the above-mentioned months.
Barnstable - Kelly: Already have regulations. Will CCPEDC provide expert testimony? 14

Eastham - Refer to local Planning Board, Paragraph #3 recommends Board of Health keep records of all pumping.
Provincetown - unnecessary because of soil conditions. Permeable soil. 15
Barnstable - Mullen: Under consideration.
Dennis - Dennis has adopted such regulations. Provided for in local regulations.

8b. 2. Require maximum possible setback of an on-site system leach facility, from a private well or surface water body. The minimum setback of a leach facility from a surface water body to be 100 feet.

Yes: BA (Kelly, Wilson), BR, BO, CH, DE, OR, PR, TR, YA (Long, Karnes, Schroeder), SA

Comments:

Yarmouth - Long: needs town meeting approval if not already a bylaw
Barnstable - Mullen: under consideration.
Chatham - See transmittal letter.
Dennis - already provided for.

3. Require applicants for permits for renovations to comply with Title 5 to the maximum degree possible.

Yes: BA (Mullen, Wilson), BR, BO, CH, DE, OR, PR, TR, YA (Long, Karnes, Schroeder) , SA

Yes and No: BA (Kelly)

Comments:

Barnstable - Kelly: yes/no--depends on circumstances
Dennis - currently in force.

4. Require licensed septage haulers to report to the Board of Health, the address of all malfunctioning systems, the cause of problems and repairs effected.

Yes: BR, BO, DE, PR, TR, YA (Long, Karnes, Schroeder) , SA

No: BA (Kelly)

Yes and No: OR

Comments:

Barnstable - Mullen: limited plan in effect.
Orleans - Yes and No, partial.
Dennis - currently required.

8c. Initiate and enforce a septic system maintenance program requiring regular system pumping. (Town cost about $2 per household for administration.)

Yes: BO, BR, DE, TR, YA (Long, Karnes), SA

No: YA (Schroeder)

Maybe: BA (Kelly)

Comments:

Barnstable - Kelly: Maybe, if staff provided.
Yarmouth - Long: yes, needs town meeting approval if not already a bylaw

8d. Require septage haulers to report location of on-site system failures and require homeowners to upgrade failing systems.

Yes: BO, BR, CH, DE, PR, TR, YA (Long, Karnes, Schroeder), SA

Maybe: BA (Kelly)

Comments:

Barnstable - maybe
Dennis - currently required

8e. Initiate an education program to inform the public of required on-site maintenance practices (with CCPEDC assistance).

Yes: BA (Kelly & Mullen), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Karnes, Schroeder), SA

Comments:

Barnstable - Kelly: already do
Eastham - recommend unanimously

9. Will the town cooperate in a Regional Septage Task Force to work towards selection of subregional septage treatment sites and acceptable treatment technologies? (Approximate cost of constructing a septage treatment facility for a small subregion could be between $500,000 to $750,000)

Yes: BA (Wilson), BO, BR, CH, DE, OR, YA (Long, Schroeder)

No: BA (Kelly), YA (Karnes), SA

Comments:

Brewster - We are interested in exploring regional possibilities
Eastham - Board of Selectmen to recommend at future Town Meeting.
Sandwich - Referring to the cooperation of the town in a Regional Septage Task Force. I believe that the only way that the Town of Sandwich will cooperate in this project at this time is that if it were included as part of a sewage treatment plant in the Town of Sandwich, which would service possibly Mashpee and Sagamore.

10. Does the town plan to upgrade to an interim lagoon system (at a cost of $20,000 to $50,000)?

Yes: BO, BR, TR, YA (Karnes, Schroeder)

No: BA (Kelly), OR, PR, SA

Comments:

Barnstable - Mullen: N/A
Brewster - Upgrading to lagoon system will probably be required for approval of new landfill area.
Chatham - have working lagoon system; phasing out.
Yarmouth - Long: This item affected by plans to construct sewerage system & treatment facility.
Eastham - no plans now.
Dennis - currently under item 9.

11. Will you seek a town bylaw or regulation to control occupancy of boats in marinas? (CCPEDC has recently received data on inner harbors that will help towns determine where such measures are necessary.)

Yes: BA (Wilson), BO, CH, OR, TR, YA (Karnes, Long, Schroeder), SA

No: BA (Kelly), PR

Yes/No: DE

Comments:

Barnstable - Kelly: no - already state law
Mullen: has been considered in past
Chatham - yes, need to clarify legal powers.
Yarmouth - Long: not a problem at moment, so far as I know.
Eastham - If it becomes a problem it will be investigated and control sought.
Truro - if necessary
Dennis - Willing to look at feasibility. Harbor Master has some control now.

Land Use and Non Point Source Control (See Ch. 5, pp. 5-46 to 5-56)

12. The 208 Draft Plan has identified non-point pollution associated with land uses as the major water quality problem on Cape cod. Will you work with CCPEDC to delineate Water Resource Protection Areas in your town and to establish overlay districts for these areas based on the recommended controls of the Draft Plan?

    Yes: BA (Kelly, Wilson), BO, BR, CH, DE, EA, OR, PR, TR, YA (Karnes, Long, Schroeder, Ellis) , SA

    Comments:

    Barnstable - Mullen: Conservation Commission & home water department interested in this.

13. Will you work to modify the town's zoning bylaw to meet the 208 Draft Plan recommendations for housing density within these areas?

    Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Karnes, Schroeder, Ellis) , SA

    Comments:

    Barnstable - Mullen: action has been taken
    Eastham - Board of Selectmen will work for modified zoning.
    Dennis - Some work has been done.

14. Will you cooperate with CCPEDC in water supply planning to protect future supplies?

    Yes: BA (Kelly, Mullen, Wilson), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Karnes, Schroeder, Ellis) , SA

    Comments:

    Chatham - planning yes. But action by town will depend on result of specific studies, Refer to letter to EPA, Appendix A7.

15. Will you encourage the use of water conservation devices through your health regulations and other means?

    Yes: BO, BR, CH, DE, OR, PR, TR, YA (Long, Karnes, Ellis, Schroeder), SA

    No: EA

    Comments:
    Barnstable - Mullen: There will be some cooperation by some town agencies.
    Eastham - question is too vague for Eastham's Sewage Treatment systems.
    Dennis - some educational steps have been taken.
    Sandwich - We have answered this question "yes", but feel that we have given you broad license on this subject, because you have no real statement of what devices you are speaking of.

17

16a. Do you plan to take the necessary steps (and increased costs) to operate the town's sanitary landfill according to all of the state's regulations?

Yes: BA (Kelly, Mullen), BO, BR, CH, DE, EA, OR, YA (Long, Ellis, Schroeder, Karnes), SA

No: PR, TR

Comments:

Barnstable - Mullen: Landfill presently state approved.
Yarmouth - Town meeting action
Eastham - Already done, have planned. All of the regulations.
Dennis - An approved master plan is on file.

16b. Most of the state's regulations?

Yes: BO, CH, OR, PR, TR

17. What state requirements do you feel can not be met in your town's landfill?

Comments:

Chatham - Impervious cover, brush chipping, 30% slope.
Eastham - Impervious cover material not available; requirement followed as closely as practical.
Orleans - N/A today
Provincetown - The operation plan requiring two operators. The Town Meeting would not vote the funds necessary.
Truro - Septage Disposal.
Yarmouth - Long: I am not really familiar with State Law on this subject.
Ellis: I would have to get a copy of these requirements as I am not that familiar with them.
Dennis - Willing to study regional septage system for trucks.

18. Will you encourage efforts to recycle certain waste materials in your landfill?

Yes: BA (Mullen, Kelly, Wilson), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Ellis, Karnes, Schroeder), SA

Comments:

Barnstable - Mullen: recycling currently in progress
Bourne - We are presently conducting such a facility within our landfill area.
Eastham - Already under way.
Dennis - Recycling program in effect since 1973. A recycling Commission has been established.

19. Will you take steps to improve methods of controlling storm water runoff by:

1. Limiting impervious areas through changes to town's subdivision regulations and zoning bylaw

Yes: BA (Wilson, Kelly), BO, BR, CH, TR, YA (Long, Ellis, Schroeder, Karnes), SA

No: OR

Comments:

Barnstable - Mullen: No opinion or feeling for towns attitudes. Has not had any wide official or public discussion.
Provincetown - This tends to be in opposition to the critical need for parking.
Truro - need advice
Eastham - If a good solution is presented, the towns will work toward implementation.
Yarmouth - Long: yes--town meeting action if not already covered

2. Minimizing the use of storm drains by encouraging surface infiltration in subdivision regulations

Yes: BA (Wilson, Kelly), BO, BR, CH, PR, TR, YA (Ellis, Long, Schroeder, Karnes), SA

No: OR

Comments:

Truro - if a problem

3. Improving street cleaning and litter control (with additional costs to the town)

Yes: BA (Kelly), BO, CH, TR, YA (Long, Ellis, Karnes, Schroeder), SA

No: OR, PR

Comments:

Truro - if a problem

20. Does the town presently store its road salts in a salt storage shed or will it have such a shed within the next year?

Yes: BA (Mullen, Wilson), BO, TR

No: BR, OR, PR , SA

Comments:

Dennis - More study required in these areas; covered storage planned.
Yarmouth - Ellis: partially

21. If not, will the town build such a shed by:

1. Seeking town funds of from $18,000 (40' X 40' shed) to $32,000 (96' X 40' shed)?

Yes: CH

No: OR, PR

Comments:

Truro - Will explore

2. Seeking state funds through MDPW local grants (these funds may not become available for a number of years, if at all.)

Yes: PR, SA

No: TR

Comments:

Brewster - State funds were refused because we had no polution problems

22. Are you willing to cooperate in educational programs and other regional efforts to minimize the amount of road salt used on state and town roads?

Yes: BA (Mullen, Wilson), BO, BR, CH, DE, EA, OR, PR, TR, YA (Ellis, Long, Schroeder, Karnes) , SA

No: BA (Kelly)

23. Are you willing to require erosion control plans for approval of subdivisons of a predetermined size?

Yes: BA (Mullen, Kelly, Wilson), BO, BR, CH, EA, RO, PR, TR, YA (Ellis, Long, Karnes, Schroeder) , SA

Comments:

Chatham - subdivisions of any size
Dennis - study further
Sandwich - We would like to state that this control is being done in the Town of Sandwich at this time.

24. Does the town have an earth removal bylaw?

Yes: BA (Mullen, Kelly, Wilson), BO, BR, CH, EA, OR, PR, TR, YA (Karnes) , SA

No: YA (Ellis)

Comments:

Dennis - study further
Yarmouth - Karnes: yes, fill bylaw

25. If not, are you willing to seek to adopt an earth removal bylaw?

Yes: YA (Ellis, Karnes)

26. Do you support a program to monitor underground gasoline storage tanks?

Yes: BA (Mullen, Kelly, Wilson), BR, BO, CH, DE, EA, OR, PR, TR, YA (Ellis, Long, Karnes, Schroeder) , SA

Comments:

Barnstable - Mullen: yes, there has been no resistance to initial investigation

27. Will you work with CCPEDC to develop such a monitoring program?

Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, DE, EA, OR, PR, TR, YA (Karnes, Long, Ellis, Schroeder), SA

Comments:

Chatham - Fire Dept. responsible. Believe monitoring methods available.

28. Will you seek a health regulation to require oil and gasoline storage tanks to be fiberglass containers and other hazardous chemicals to be stored in appropriate non-corrodable containers?

Yes: BA (Wilson), BO, BR, EA, OR, PR, TR, YA (Ellis, Karnes, Long) , SA

No: BA (Kelly), CH

Comments:

Barnstable - Kelly: No, not a health regulation. 19
Brewster - We favor non-corrodable containers for oil, gasoline and chemical storage whether they are fiberglass or not.
Chatham - Understand not enforceable by local Board of Health. 20
More information needed on containers.
Dennis - willing to study such proposals.
Eastham - yes, Board of Selectmen will recommend these until better alternatives are presented.

Areawide Management (See Ch. 6, pp. 6-16 to 6-21)

29. Do you agree with 208 Draft Plan recommendation that the following management functions should be carried out by CCPEDC as part of a continuing Water Quality Planning Program:

1. Planning, Program Development and Coordination

Yes: BA (Mullen), BO, BR, CH, DE, OR, PR, TR, YA (Schroeder, Long) , SA

No: BA (Kelly, Wilson), YA (Karnes)

Comments:

Barnstable - Mullen: There is general agreement to this.
Wilson: No, Need independent Authority NOW!
Kelly: No, County Health should take over program. 21
Brewster - By CCPEDC or other County Agency.
Eastham - Conditional on review of function and ability of CCPEDC to perform the job.
Yarmouth - Karnes: No, under County direction. 22

2. Water Quality Monitoring (using County lab facilities)

Yes: BA (Mullen, Wilson), BO, BR, CH, DE, OR, PR, TR, YA (Long, Schroeder)

No: BA (Kelly), YA (Karnes) , SA

Comments:

Barnstable - Mullen: There is general agreement to this.
Kelly: No, County Health should take over program. 23
Brewster - By CCPEDC or other County Agency.
Eastham - Prefer County Health upgraded to do planning & monitoring 24
Yarmouth - Karnes - No, under County direction 25
Sandwich - Not as being done now.

30. Do you feel it may be desirable in the future for a greater regional role (possibly an independent authority) in the following areas:

1. Structural Facilities Planning, Construction and Management

Yes: BA (Mullen, Wilson), BO, BR, CH, OR, PR, TR, YA (Karnes, Long, Schroeder)

No: BA (Kelly) , SA

Comments:

Barnstable - Mullen: Sewerage
Chatham - Possibly; but, do not favor independent authority. Should be responsive to taxpayers. Prefer obtaining technical assistance as needed.
Eastham - More regional planning as necessary, implementation preferred on local level--subject to more information.
Yarmouth - Long: Yes, I concede the possibility that such steps may become desirable, but I would want more study on the subject.

2. Water Supply Management

Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, DE, OR, PR, TR, YA (Karnes, Schroeder, Long)

No: SA

Comments:

Yarmouth - Long: Yes, I concede the possibility that such steps may become desirable, but I would want more study on the subject.

3. Non-Point Source Control

Yes: BA (Mullen, Wilson, Kelly), BO, BR, CH, OR, TR, YA (Karnes, Long, Schroeder)

No: DE, PR , SA

Comments:

Yarmouth - Long: Yes, I concede the possibility that such steps may become desirable, but I would want more study on the subject.

4. Land Use Control

Yes: BA (Wilson, Kelly), BO, BR, CH, OR, TR, YA (Schroeder, Karnes, Long)

No: PR, DE, BA (Mullen), SA

Comments:

Yarmouth - Long: Yes, I concede the possibility that such steps may become desirable, but I would want more study on the subject.

Sandwich - If independent authority is really independent and not run under or as part of CCPEDC answers will be reversed. I have answered all of these questions negatively, because I feel that if this is to be done it has to be an independent authority and to clarify "independent," I would say that this independent authority shall be completely independent of the Cape Cod Planning & Economic Development Commission. I do not believe that this independent authority should be run the way that the 208 Program has been run. I have stated in the past that I do not believe you can get a qualified person to really do the job that you are proposing for $16,000. and retain the man. I think that if we are going to institute this proposal it should be done properly and people who are familiar with and have had experience in this field should be the people to decide who is qualified to be hired and how the work is to be done.

26

31. Will you participate in the Water Resources Advisory Council?

Yes: BA (Mullen, Kelly, Wilson), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Karnes)

No: SA

32. Will you support creation of a county position of water resources planner ($15,000/yr.) to manage the continuing CCPEDC water quality planning program?

Yes: BA (Wilson, Mullen), BR, TR, YA (Long, Karnes, Schroeder)

No: BO, CH, SA

Comments:

Barnstable - Mullen: Most townspeople and officials would support this, some don't
Kelly: No, looks like creating jobs after federal monies spent utilize existing staff.
Chatham - Suggest that above WRAC should consider question how to continue program.
Dennis - Need to develop the total program first.
Eastham - too vague to comment on.
Orleans - depends on what they would do.

27

33. At the present time, the Cape Cod towns can only participate in regional programs through the County assessment. Would you support legislation to allow the County to enter into contracts with interested towns to perform more extensive water quality work for them? (County/town contracts could also be used to support other regional activities as well.)

Yes: BA (Mullen, Kelly, Wilson), BO, BR, PR, TR, YA (Long, Schroeder, Karnes), SA

No: OR

Comments:

Barnstable - Mullen: Yes, This is a personal response, but I have never heard any resistance to such an idea.
Chatham - Need to clarify cost of County organization to be able to handle such contractors. 28
Dennis - Specific programs needed to be defined in order to answer this question.
Eastham - too vague to comment on.
Orleans - At this time it wouldn't benefit town.

Local Perspective (See Ch. 7, pp. 7-1 to 7-4 and Town Profile)

34. Do you feel that the assessment of your town's water quality and wastewater management problems is generally correct?

Yes: BA (Wilson, Mullen), BO, BR, CH, DE, EA, OR, PR, TR, YA (Long, Karnes, Schroeder) , SA

Comments:

Chatham - Generally yes, but evident that some details are not clear or completely stated.

35. Do you agree with the recommendations that are made for town action, particularly the selection of a wastewater management alternative?

Yes: BA (Wilson, Mullen, BO, BR, DE, OR, PR, YA (Long, Kanres, Schroeder), SA

No: BA (Kelly)

Yes/No: CH

Comments:

Chatham - Yes, as to agreement in principle.
No, as to implied obligation to implement.
Provincetown - The town reserves final opinion until a 201 facilities plan is available. 29

36. Please indicate any specific information or recommendations you want to have included in the Town Profile. Also, indicate any questions about the information or any changes you feel should be made.

Comments:

Barnstable - Mullen: See end comments.
Kelly: See Board of Health comments.
Chatham - S.T.P. with septage facility nearing completion should be indicated. 30
Dennis - Revise pg. 7-17 as previously discussed with 208 staff. Map 5.1, Pg. 5-15 and Pg. 5-28 require corrections.

Dennis - Revise pg. 7-17 as previously discussed with 208 staff.
Map 5.1, Pg. 5-15 and Pg. 5-28 require corrections. 31
Curt Livingston (tel. 398-8031) has data.
Eastham - No additional requests, all basic studies should be 32
updated.
Orleans - Dump plume and more monitoring

37. Do you favor continuation of the 208 review committee to further local water supply planning activities and to work with the CCPEDC to implement the 208 recommendations?

Yes: BA (Wilson, Kelly, Mullen), BO, BR, CH, DE, EA, OR, TR, YA (Long, Schroeder), SA

No: PR

Comments:

Chatham - Yes, In Chatham,Natural Resources Advisory Committee working in close cooperation with town boards provides satisfactory means for this.
Eastham - Yes, better communications from CCPEDC to local level desired.

Sandwich - Include recommendation for Fish Hatcheries. 33

FINAL COMMENTS:

Barnstable - Wilson: It is essential to continue a citizens 34
committee for implementing this program!
Mullen: This questionnaire cannot be filled out by a committee,
but must be done by the officials designated to the towns 35
committee answering only those sections which are applicable
to their field. I'm not sure the questionnaire has any real
value. With 208 plan, coming to a close, the one outstanding
job remaining and task which must be accomplished is public
education and town officials indoctrination to the plans
concept. The second most important or equally important
task at hand, is to provide a back up of information and
expertise for town officials when they seek bylaw and regulation
changes to comply with the plan.
Kelly: most of these questions are not simple yes or no answers.
See Board of Health Comments submitted to Tom Mullen. 36
Many of the questions are beyond the scope of authority of
the Health Dept., Finance Committee, personal Boards and
Town Meeting motion may be required.
Brewster - This Review committee feels that the 208 Draft Plan
EIS is well written and thorough and, at least in the case
of Brewster, suggests a reasonable course of action. Our
concern is to insure that "on-site systems" be installed
(and/or upgraded) and maintained so that our groundwater will
remain unpolluted and the need for sewering indefinitely
postponed. Note: Some other comments, errors, etc. are
contained in another letter.

Dennis - 208 Draft Plan (March'78) is considered very complete. Dennis has in-place many elements of the plan. Continue groundwater monitoring of the sanitary landfill and continue update of local regulations are "home rule" elements which can be pursued. Place emphasis on greater coordination with various town boards such as Water Dept./Conservation Commission. Place emphasis on maintenance and update of existing sanitary systems. Work with county to identify Water Resource Protection Areas. Work with county on identifying/studying regional septage areas.

Eastham - Need for a combination of local and regional efforts to solve problems is apparent from this discussion.

Orleans - As stated previously we are in favor of subregional and regional activities to give us enough concerted pressure to obtain assistance and localized relief to help solve our problems in the best manner possible for the good of our town.

Provincetown - There must be economic projections of the result of sewering and a program of costs and an estimated schedule of payments for users. The financial means and effects of this program, if adopted, are not clear. 37

Truro - The Plan review committee, although recognizing the advantages of sewering Beach Point, also finds problems with this plan. Sewering an area implies a stable land for in which Beach Point is not. It is an unstable barrier beach subject to flooding and to erosion and building. Development of the area further is inadvisable and may be dangerous. Alternative solutions to the problem should be sought. We are willing to work with neighboring towns in solution of mutual problems. 38

Yarmouth - Luther Long: 1. I believe that this study is a <u>conservative</u> appraisal of the water quality and quantity situation as it applies to the Town of Yarmouth. 2. I believe that <u>immediate</u> steps are necessary to deal with the category 1 areas in the town, and to identify and protect the recharge areas of existing well sites to the maximum degree feasible. 3. I believe that an intensive campaign of education (or re-education) is required to change the pattern and rate of growth in the town--to prevent further deterioration and to preserve those qualities which make the town an attractive place for visitors and residents alike.

Chapter 5: 1. I find the study as a whole to be a thorough and helpful presentation of the water quality management problems confronting Cape Cod communities, and our own in particular. Such specific criticism as I have do not in any way attack the validity of the study as a whole, and can be dealt with in our own approach to implementation of the Study's recommendations in Yarmouth.

a. It seems to me that the population estimate for 1995 Table 5-1) is perhaps too conservative, considering the number of buildable lots now on the books which are still vacant. 39

b. It seems possible that disposal of hazardous chemicals may be more of a problem than the emphasis given in this study would indicate--perhaps a little more attention--especially in the area of recommended solutions would be desirable. (Page 5-23) 40

c. I cannot understand what is meant by assumption 3 & 4 (Page 5-37). 41

On Page 5-31, under Growth Control the Study indicates that the degree to which the towns will intervene in the rate of population growth will depend on "the perceived need." That factor will weigh heavily in every aspect of the implementation of the recommendations of this study.

If you consider it to be within the charter of this review committee to consider means of attracting increased public attention to and interest in the problems of water quality management and the solutions presented in this study, I think it would be helpful.

Sandwich - General Comments regarding Chapter 4: Referring to septage treatment disposal options with approximate costs. I think that this table should either be reviewed and revised or specific comments should be made that would correct some of the inaccuracies. I find that the comments on the composting septage particularly, the cost factors, are very inaccurate. 42

Table 4.3 - Descriptions of just what the cost factors are is poorly described. The flows that are shown on Table 4.5 and also the costs on Table 4.5 should be more accurately documented. 43

The Section for Vacuum Collection of septage systems emphasizes the advantages of this system. It has been proven that most of these systems have been absolute failures. 44

Page 4-57 - The description of infiltration - Percolation is very poorly done and quite misleading. Possibly this should be rewritten. 45

Page 4-58 - I think that you have neglected to list one of the major disadvantages of the aerated lagoons mainly that you haven't included the land area requirements and their related costs in your descriptions and yet your discussion of ocean outfall seems to be deliberately written to show the disadvantages of this system. 46

I think that we should discuss these systems fairly and openly and present them as they should be presented. Also, the comparison of Cape Cod to Long Island, although having been used many times in the past by certain groups on the Cape, doesn't seem to be a fair comparison. The description of sludge disposal has not been done completely enough and possibly should have more emphasis placed in this section. 47

Page 4-82 and 4-83 - There is a discussion of water quality effects of infiltration percolation, spray irrigation and ocean outfall. It would appear once again that the objectivity is not the criteria and because of this your comparisons on Page 85 are not really objective and possibly should not be considered. 48

We heartedly endorse the site management of septage treatment. It would seem though that in reviewing the overall text of this section and the proposals, it would be better if we could administer this type of work under administrative plans that would not put into effect another layer of bureaucracy in the water pollution control field.

Chapter 5 - General Comments: Once again I would like to state that the Town of Sandwich feels that the population projection figures compiled by the Herr Associates should be identified at the very outset to be just what they are, a study, and comparatively inaccurate. We have proven to you, even before the study was one-quarter done, that these figures were inaccurate and in some instances we were within 100 or 200 people for the projections for 1985. Also, I would like to again mention your reference to Water Conservation Devices under Question 15. I am reluctant to answer this question, "yes" when I realize that the discussions that have gone on over the past two years regarding this type of device. In no way do I want my "yes" answer used in the future to promote the use of some of these systems in areas that they absolutely should not be used in and are not needed. There are many areas of Cape Cod where there is no reason to be using some of these devices that are being promoted. 49 50

Chapter 6 - Areawide Management - Question 29: Water Quality Monitoring (using the County Lab): I feel that I can't answer this question in the affirmative, when I know that all the tests being done by this Lab have the results returned to the Boards of Health. In some instances, there are other Town Agencies that would like to have tests done and have the test results returned to them. I think this could be worked out, but I think it should be mentioned at this time. If, in fact, we are going to do this type of work, this facility has to answer or render service to agencies other than just Boards of Health when required. 51

Comment in the Town Profile: The 208 Program should definitely recognize and make a recommendation that the Commonwealth of Massachusetts should make every effort to recycle and reuse the more than ½ million gallons of water being used every day in the fish hatcheries, which presently is flowing to the ocean.

208 STAFF RESPONSES TO:

Local Draft Plan Review Committees
Water Quality Questionnaire Summary

1. While the County Health Department has agreed to cooperate in the proposed comprehensive water quality monitoring system, it is only one part of the total program. The County Health Department does not have the staff capability or financial resources to carry out the various elements of such a comprehensive monitoring system. The various types of water quality monitoring proposed, go beyond the concerns of the County Health Department (such as pond eutrophication) and must be addressed by appropriate agencies involved in these problems. The coordination of various state and federal agencies involved in monitoring efforts along with the County Health Department is needed and should be performed by CCPEDC as recommended in the "Management Agencies" section.

2. CCPEDC has been supportive of the County Health Department having a permanent full-time chemist on its staff. While County Health had the services of a chemist under the CETA program up until June, 1978, the department has not as yet retained another chemist through the CETA program. While County Health is presently seeking to obtain this CETA position and hire a chemist, it must be remembered that this individual can only be retained for a one year period. For a useful and efficient private well monitoring program, there must be continuity in this position. CCPEDC, therefore, supports the County Health Department's efforts to establish this position as a permanent County position. It is agreed that the support services of a sample collector are needed and are presently available through a CETA research assistant position on the 208 staff. This position should also be made secure through federal funds or by establishing a County position.

3. Mr. Kelly was one of the individuals who attended a meeting with USGS representatives, sponsored by the 208 program to discuss local interest in having USGS conduct a landfill monitoring study on Cape Cod. USGS would provide matching funds to towns interested in participating. Mr. Kelly indicated at this meeting, that while the town was interested, it did not wish to become involved in such a program at this time. It is hoped that Barnstable, along with a number of other interested towns, will want to cooperate in a USGS regional landfill monitoring study in the coming year.

4. More information on the possibility of a USGS regional landfill monitoring study will be provided by the 208 staff in the coming year. Orleans will have to develop a landfill monitoring program as part of its 201 facilities plan if the plan recommends the landfill as a site for a septage treatment facility.

5. See responses to Chatham Board of Selectmen comments.

6. 208 staff will discuss this problem area with town officials to determine if a change in category is needed.

7. It is agreed that further information on the disadvantages of these systems should be made available. The 208 staff is aware of their limitations and have, therefore, suggested their use only in severe problem areas. The cost estimates presented for these systems is based on recent information and we do not believe they are inaccurate.

8. Authority to require upgrading of failing systems and approving innovative systems is provided in Title 5. Requiring water conservation devices in new construction and/or replacing old fixtures must be passed as a town bylaw.

9. DEQE is sponsoring a one year study of composting toilets and their grey water systems. It is hoped that this study will help resolve Mr. Kelly's and the 208 program's reservations regarding these systems.

10. While it is true that Barnstable has a sewage treatment facility and is presently expanding that facility, all future facility planning carried out by the town must consider all alternatives, and not merely the further extension of the sewage collection system, for cost effectiveness and environmental impacts. Further, a number of category 2 areas in Barnstable have not been addressed in its present facility plan.

11. The 208 staff has been supportive of the Orleans 201 facility planning effort and the possibility of a sub-regional septage facility being constructed in Orleans to serve Brewster and Eastham as well. It is hoped that the conflicts that may have existed between LEA and EPA can be resolved through this type of mutual cooperation.

12. It is recognized that additional personnel would be required in Barnstable and in a number of other Cape towns to carry out this program. The 208 staff will assist and support local efforts to obtain additional personnel.

13. Perhaps there is some confusion concerning the position of the Barnstable Board of Health and its health agent. Further exploration of the possibility of hiring additional Board of Health personnel for an on-site system management program should be pursued.

14. See response to Barnstable Board of Health comments.

15. See "On-Site System Management" section in final plan.

16. The idea of the Septage Task Force would be to explore the possibilities of regional cooperation in septage treatment at acceptable treatment facilities such as a sewage treatment plant in Sandwich. See "Facilities Needs in Non-Sewered Areas".

17. See "Water Conservation" in final plan.

18. Parking lots can be designed using pervious cover materials especially for areas that will only be used primarily during the summer months as implied by this comment.

19. The "Gasoline and Oil Storage and Spills" section amends this recommendation to recommend a town bylaw to be adopted for this purpose.

20. It would be enforceable by a town bylaw not a health regulation as previously suggested. The permits would continue to be issued by the fire chief who would implement the requirements of the town bylaw.

21. The County Health Department does not have the authority or staff capability to manage the 208 areawide water quality management program.

22. CCPEDC is a part of county government and all funds provided through the 208 program by EPA are accepted under a contract signed by the Barnstable County Commissioners.

23. See response #1.

24. See response #1.

25. See response #1.

26. Funding limitations make it very difficult to offer more than $16,000 - $16,500 for professional staff positions. We agree that these funds make it likely that many applicants will not have extensive experience. However, there are many qualified individuals in the field and few jobs. This salary level is not out of keeping with other regional planning agencies and we believe many qualified individuals would welcome the opportunity to work on Cape Cod.

27. There seems to be some confusion regarding the role of the proposed water resources planner. As discussed in Chapter 6 of the Draft Plan, there is no guarantee that federal funds will be provided on a permanent basis to support the continuing 208 water quality management program. Over the next 1-2 years, it does appear likely that funds to support at least one position will be available. To provide the assistance needed to carry out the recommendations of the 208 plan, a professional staff of one water resources coordinator (title change reflects discussion in "Management Agencies" section), one technical associate and one research assistant. By at least creating a county position of water resources coordinator, the program will have the needed staff as long as federal funds are available and should the federal funds end, the program can still continue through the county position.

Water resource protection has been a high priority for action among Cape Cod citizens and officials for a number of years. The 208 program has set a long-term strategy for protecting these resources but requires a minimum commitment of staff to update and assist in implementing this important program.

28. The cost of contract preparation and administration would be borne by the town contracting the services of CCPEDC as it would in contracting the services of any consultant. The cost to the County would not increase

since new staff hired for a specific project would be paid for directly with the contract funds.

29. The 208 plan's major recommendation to Provincetown is to pursue completion of its 201 facilities plan.

30. It has been noted in the final plan, Chatham Recommendations.

31. See Appendix A of the final plan.

32. With a continuing 208 planning staff the 208 plan is required to be updated on an annual basis.

33. Recommendation has been included in final plan, "Water Conservation" section.

34. See "Management Agencies" section for discussion of proposed Water Resources Advisory Council.

35. The questionnaire did have some serious limitations but has been helpful particularly in indicating which of the draft plan recommendations are not well understood and which need to be further detailed. It is agreed that public education and providing technical assistance are the two main tasks for the continuing 208 program.

36. It is agreed that many of the questions posed in the questionnaire could not be answered by any one board or even all town boards as a group. In certain cases town meeting action would be required, but the purpose of the questionnaire was to determine the intent or interest of these boards in working towards the implementation of the 208 plan recommendations. It is only through this type of cooperation that efforts will be made to implement the 208 recommendations through the necessary town board or town meeting action.

37. Such detailed cost figures will be developed in a completed 201 facilities plan for Provincetown.

38. This is a very good point and one that needs further study. Hopefully, Provincetown will address the environmental impacts of sewering Beach Point in a 201 facilities plan (if the town completes the plan as recommended).

39. The population projections will be updated as part of the continuing 208 program and further attention will be given to the Yarmouth projections as you suggest.

40. See "Sanitary Landfills" discussion in the final plan.

41. This was a typographical error, see "Draft Plan Errata Sheet," Appendix A.

42. See "Septage Treatment and Disposal" section of final plan.

43. See "Septage Treatment and Disposal" section of final plan.

44. It is recommended that towns evaluate vacuum sewage systems in future 201's. (See statement on page 4-53 "The technology of vaccuum sewers to serve individual houses is still in the experimental stage... towns should be kept abreast of recent developments in the field..."

45. Unless specific comments are given, we have no basis for rewriting this section.

46. The amount of land area required for lagoons is indicated on the table. If land area is not available (which is not always the case) this can be a disadvantage.

47. Again, specifics are necessary in order to respond to comments.

48. The purpose of this review period was to discuss environmental impacts in particular. We would have been pleased to receive specific comments on how this assessment could have been improved. See discussion of "Sewage Treatment & Disposal" in the final plan.

49. We recognize that further work on the population projections is needed and will be part of the continuing 208 program. Please refer to p. 5-2 of the draft plan which directly addresses both of your comments on the projections and which was added in response to your earlier comments on this issue.

50. We are not clear from your comments on water conservation devices as to what objections you may have to their use on Cape Cod. While it is true that water conservation may not be essential in certain parts of the Cape from a water quantity standpoint, certainly the economic benefits of their use is clear.

51. It is the general policy of the County Health Dept. to send test results to the board requesting the information with a copy to the board of health. This procedure seems appropriate. However, if you have further comments we could discuss the flexibility of this procedure with the health department.

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